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PROFESSOR W. C. SCHIMMELL.

THE onerous duties involved in the acceptance of the office of President to so large and influential a gathering as an International Veterinary Congress can only be understood by those who have visited one of these assemblies, and to carry them out satisfactorily without giving offence to a group of delegates, or even to a single individual, would seem almost an impossibility. That such, however, *is* possible has been demonstrated at The Hague Conference, and the tact and courtesy displayed by Professor Schimmell aided by the very evident amount of hard work with which he must have prepared the arrangements beforehand, more than justified his selection to the honour of the Presidential Chair. On every hand the utmost loyalty was shown to him both by the Congress members themselves and also by his hard-worked staff, and the whole of the proceedings, including the social functions, passed off without a single hitch.

As one of the professors in the State Veterinary School at Utrecht, his name is well known to all veterinarians in Holland, and he is one of those selected to act on the permanent committee of all International Veterinary Congresses. His knowledge of veterinary matters and his fluency in languages, combined with his excellent courtesy and tact, made him an ideal President, and it is certain that the success of the recent proceedings can be said (without detracting one bit from the value of the services of the genial Secretary, Professor de Jong, and other officials) to have been very materially helped by his personality.

Editorial.

THE VETERINARY PROFESSION AND THE STATE.

THE Ninth International Veterinary Congress, recently held at The Hague, presented few, if any, more interesting features to English-speaking delegates than the relationship between the veterinary profession and the State, and an excellent opportunity was afforded for observing the effects of the attitude of the State towards the development of veterinary science.

His Royal Highness Prince Henry of the Netherlands formally opened the Congress, presided in person throughout the first session, and tarried in the hall after the close of the meeting to meet personally many of the delegates.

During the following evening Prince Henry received the regularly accredited delegates at the Royal Palace. He neglected no opportunity to assure the members of the Congress of his personal and official appreciation of the veterinary profession and its work.

At the close of the banquet tendered by President Schimmel, a message from Queen Wilhelmina was presented, expressing her good wishes for the success of the Congress.

The Minister of Agriculture for Holland was present at the opening meeting and gave a hearty address of welcome, was present at the President's banquet and presided at the general banquet.

The Minister of State for the Interior attended the general banquet and gave an address. The Government of Holland gave a general reception to all veterinarians in attendance, as well as their ladies, the reception being attended officially by the Ministers of Agriculture and of the Interior.

Such honours paid by a Government to the veterinary profession naturally awakened interest in the relationship existing between the various Governments and the veterinary profession.

At the banquets this relationship was again made very conspicuous. The leaders of Continental veterinary science wore upon these occasions conspicuous decorations which had been conferred by Presidents, Kings, and Emperors. Like the attention paid the Congress by the Dutch Government, so here there was evidence of great respect for, and appreciation of, the veterinary profession.

The student needs only to go a step further to find that the

respect of Continental European Governments for veterinary science is not superficial, but is profound and real.

The Governments have established and vigorously supported veterinary education for the welfare of the State. Austria, Belgium, France, Germany, Holland, Denmark, Hungary, Italy, Sweden, Spain and Switzerland, each have their State Veterinary Colleges, well equipped, well manned, and well supported.

The English-speaking countries have done practically nothing and have left veterinary science to private colleges and personal efforts. The British Government has almost completely ignored the value of veterinary science for the preservation of its vast live-stock wealth and for insuring to its people healthful meat and milk. The United States, or perhaps more strictly speaking some of the individual States, have lately become aroused to the necessity for promoting veterinary science beyond what may be expected or demanded of private effort, and have done more during the past year for advancing veterinary education than the British Empire has done during the past century. The Belgian Government has expended as much money for the advancement of veterinary education as has the British Empire and the United States combined, and were we to add the total cost of all the private colleges in these two countries, the equipment, State and private, would scarcely equal that of Belgium.

These variations in the attitude of the State towards veterinary science necessarily affects the character of the profession as a body, and cause an essential difference in the character of the average type of man drawn into the profession. On the Continent the State founds the College, places it upon a high plane, draws into the school a high type of young man, and educates him thoroughly. As soon as he has finished his course with credit an honourable and lucrative position awaits him in college, army, civil service or elsewhere, and there is no question about his honourable future. The State has educated him because it needs his services, and naturally uses him and respects him.

In the British Empire and in the United States most veterinary students are in private colleges, pay for their education and get what they pay for, less any profit the school may reap. A student enters a veterinary college because he "loves" a horse, a hound, or a shilling. He often comes out a "horsey" veterinarian and veterinary science is not considered. Some of these men still say that veterinary practice is not a profession, but only a trade, and they are right in too many cases. Some British and American veterinarians believe themselves much superior to their colleagues

on the European continent, and we freely assert that English and American veterinarians have done, and are still doing highly creditable work. But we must also confess that our Continental European colleagues are far in advance of us in many ways.

Our "English" and "American" veterinary literature has been very largely absorbed, translated, borrowed or stolen from European writers. The English-speaking countries have plenty of just as good men as European nations, and a few have done valiant work in veterinary science in the face of great discouragement. When an emergency arises in either of these countries, the Government picks up a man who has secured the best education he could at his own expense in a private veterinary college, gets what it can out of him, grumbles about his incompetency and turns him adrift.

The making of the veterinarian has cost the State nothing, his services may be invaluable, but his future is a matter of no concern. Yet under these trying conditions the English-speaking veterinary profession has rendered great services to the State—without honour, without educational help, without emoluments. In no other country has veterinary science reached so high efficiency *without* State aid—no other States have forced the profession to try to accomplish the task alone.

The necessity for better educated veterinarians to care for the great live-stock interests of the United States is rapidly forcing State veterinary education upon them. Americans have been very frank in condemning their veterinary schools and thereby hasten something better. The most effective way to secure State aid for veterinary science is first of all for the English-speaking veterinary profession to frankly and openly confess its inability to do what it ought to do for the conservation of the health of animals without State aid in education and State support in veterinary work.

It is only necessary to spend a very brief visit in a veterinary school in Germany, Holland, or any other Continental country to have the fact brought home to the minds of all, and even the most self-opinionated bigot could not fail to be convinced.

An account of the meetings, together with the resolutions passed by the Congress, will be found on next page.

THE NINTH INTERNATIONAL VETERINARY CONGRESS.

THE value of the International Veterinary Congress is increasing at each meeting, and the ninth can truly be said to have rivalled the last (held at Budapest), not only from the number of members, but in the interest of its discussions, the manner in which the veterinary professions of different nationalities were socially brought together, and in the orderliness of the arrangements. Although the English-speaking races were not respresented to anything like the extent to which they ought to have been, there was a much better muster than usual, as the British Government, the Board of Agriculture, the Dublin Castle Authorities, the Veterinary Colleges, and several of the Veterinary Medical Societies had deputed delegates to attend. Several members had brought their wives and other members of the family, and the fame of Scheveningen as a place at which to spend a pleasant holiday is well known in England.

Most of the British representatives crossed by the boat from Harwich on the night of the 11th, and after a pleasant crossing and a short railway journey through characteristic flat, low-lying country, thickly populated by black and white milch cows, and drained by numerous canals, arrived at our destination about 8 o'clock on Sunday morning.

On Sunday evening a reception was held by the Executive Committee, so that members of the Congress already arrived might meet, renew old friendships, and make fresh acquaintances. It was especially characterized by its informality and apparent good humour on the part of all.

It would, be quite impossible to find buildings more suitable for the purpose of such a Congress as this than the Kurhaus, with its spacious halls and numerous smaller rooms, which made excellent offices for the various secretaries and their assistants. Moreover, it is part of the same buildings in which the Kurhaus Hotel is situated, and where many took up their quarters in order to be close at hand for their arduous duties.

On Monday, the 13th inst., the opening ceremony was performed by His Royal Highness the Prince Consort, who came in person attended by several of his Cabinet Ministers, notably the Minister for Agriculture, and to all of whom the veterinary profession throughout the world owes a debt of deep gratitude for the great honour they have conferred upon us through the medium of this Congress.

The Minister for Agriculture, as President of the Committee of Honour, presided at the opening ceremony, and gave his address in French, pointing out the importance of veterinary science to agriculture in general, and its especially great importance in such an agricultural country as Holland. He pointed out too that in such a Congress the means were provided for the beneficial exchange of the result of scientific work. Then, speaking in English, his Excellency welcomed the many representations of the English-speaking countries, with which he admitted ties of friendship and trade, and thanked them for the support they were giving to the Congress.

His Royal Highness Prince Henry then responded to the invita-

A GROUP OF ENGLISH-SPEAKING DELEGATES AT THE HAGUE.

tion to declare the Congress open, and speaking in French, German, and English, concluded by hoping that the work would meet with every success, and declared the Ninth International Veterinary Congress opened.

Professor Schimmell, of the State Veterinary College at Utrecht, who had been elected President of the Congress and of the Executive Committee, then gave his address, and appointed his officers for the week, including several British representatives, viz.: President of Honour of the Congress, Professor Sir J. McFadyean, to preside over the fourth General Meeting; Vice-President of Honour of the Congress, Mr. Stockman, to assist at the first General Meeting. Professor Dewar and Dr. Theiler were made Presidents of Sections 3 and 5 respectively, and Mr. Trotter, of Glasgow, Vice-President of Section 1. Professor Arloing was elected a Honorary Life Member of the International Veterinary Congress, with much applause.

During his address, Professor Schimmell gave a *résumé* of previous International Veterinary Congresses, and he pointed out that they owe their origin to the suggestion of an English veterinary surgeon, viz., Professor John Gamgee, who issued a circular to various veterinary surgeons and professors in Europe, inviting them to meet at Hamburg in 1863, during an Agricultural Congress, to discuss questions of general interest to veterinary surgeons and agriculturists, such as the causes and prevention of contagious diseases. About one hundred veterinary surgeons responded to the invitation, together with many agriculturists, and so the series commenced. It is remarkable that, although brought into being by the instrumentality of an Englishman, the Congress has never yet met in England, and this is due to the apathy of British veterinary surgeons and the British Government, for such a Congress must of necessity have State assistance. We are glad to say that this anomaly is shortly to be remedied, for the British Government has issued an invitation for the next Congress to be held in London, and that invitation has been accepted. Consequently, fifty years after Gamgee started these International Veterinary Congresses, his country will appropriately celebrate the jubilee.

After the President's address, the first official delegates from various countries each made a short speech, and Sir John M'Fadyean made a brief statement on behalf of England in a few happily chosen words. As the speeches progressed applause was given in direct proportion to their brevity.

In the evening a reception was given at the Royal Palace by His Royal Highness to various delegates, who received commands.

The main business of the Congress began on Tuesday morning at 9 o'clock, Dr. Lydtin, of Baden-Baden, in the chair, by a discussion on "Government efforts against Swine Plague and Swine Fever." His Royal Highness the Prince Consort graced the proceedings with his presence. Papers were presented on this subject by Dr. Dorset, of Washington, who was first to demonstrate that swine fever was due to a filterable virus; by Professor Hutyra, Professor Ostertag, and Mr. Stockman. The conclusions ultimately agreed upon were that swine fever and swine lung plague are different diseases, and require different methods of control. That swine fever is due to a filterable virus. That in regions where the epidemic is limited in degree compulsory slaughter is to be recommended. Where the disease is

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extensive other methods should be adopted, such as are employed against other contagious diseases. In this connection protective inoculation with serum of hyper-immunized swine diminishes mortality, and further investigation in this direction should be undertaken by the various Governments. Dr. Dorset spoke very strongly in support of the safety and efficiency of immunization. Mr. Stockman had not met with quite such favourable results, but his experiments had been conducted on a much smaller scale.

The next subject discussed was "The Protection of the Practice of Veterinary Medicine," in which three papers were presented. Such protection was shown to be necessary not only for the proper working of sanitary medicine, but also to put a stop to injury constantly inflicted to the property and health of man, as well as the indescribable sufferings that empirics daily inflict on animals. The Congress resolved that in those countries where veterinary practice is not adequately protected by law it is advisable that such legal provision should be introduced in order to elevate the standard, and to afford more attraction to the study of veterinary science.

In the afternoon, Dr. Bang, of Copenhagen, in the chair, the first subject discussed was on "The *Rôle* of the Veterinary Surgeon as an Expert in Zootechnical Questions," and four papers were presented. Zootechny is the study of the animal body, including biology, physiology, and hygiene, especially with reference to the production and improvement of animals. Veterinary surgeons have unique opportunities of becoming experts in these matters, and it is their duty to become so in order to give advice concerning the choice and purchase of animals for breeding and other special purposes.

The second subject for the afternoon was "The Conditions Necessary to Obtain a Doctorate in Veterinary Science." On this subject three papers were submitted and discussed. It was ultimately agreed that the institution of a degree of Doctor of Veterinary Science is desirable; that it should be optional and conferred by such bodies as universities under similar conditions as those required for the Doctorate in other scientific departments, and indicating that the holder possesses special knowledge and has engaged in scientific research.

In the evening a reception was given by the Dutch Government, represented by the Minister for Agriculture and the Minister for Foreign Affairs.

The proceedings of Wednesday commenced at 9 o'clock, Dr. Hutyra, of Buda-Pesth, in the chair. The first subject was on "The Sanitary Control of Milk and the Obligatory Inspection of Meat." Six papers were presented, including an excellent one by Mr. Trotter, of Glasgow, who emphasized the necessity for uniformity of inspection. After discussion, the following conclusions by Dr. Edelmann, of Dresden Veterinary School, were adopted:—

(1) The principal object of obligatory State inspection of meat is to protect human health from the dangers threatened by the use of meat.

(2) Only veterinarians are qualified by their technical knowledge to have charge of meat inspection.

(3) It is in the interests of the State, in order for the inspection to

be depended upon, to give the inspectors a proper social position with corresponding remuneration.

(4) Obligatory inspection includes the examination of the animals before and after slaughter. It includes imported meat, even though it may have been inspected in the country it comes from.

(5) It is useful to divide meats into good, relatively good, and bad. Bad meats must be disposed of in such a manner that disease germs cannot be propagated. Relatively good meat should only be sold in the town of slaughter and under police control.

(6) Inspection ought to extend to other food of animal origin—game, fowl, fish, crustaceans, and molluscs.

(7) The great importance of official abattoirs cannot be overestimated in point of view of general hygiene and efficient inspection. Veterinarians have proved themselves excellent directors of official abattoirs.

(8) It is desirable that veterinary students should have more opportunities to become familiarized with the technique of abattoirs and their workings.

In connection with milk, it was concluded that compulsory inspection should be instituted to include matters of hygienic stabling, feeding, transport of milk, and dairies, and places used for the sale of milk. That such duties are essentially veterinary, and that examination for adulteration, skimming, and the use of preservatives is in the province of a specialist in such matters.

The second subject discussed was "The Methods Employed in Treating Carcases and Meat with the Object of Rendering them Harmless," three papers being presented. It was finally recommended that special apparatuses should be introduced to effectually destroy diseased materials for food purposes and reduce them to bye-products which would be useful, such as artificial manures, &c.

On Thursday morning the chair was taken at 9 o'clock by Professor Sir John McFadyean. The first subject dealt with was "The Prophylaxis and Pathology of Protozoan Diseases," and seven papers were presented by men whose names are very familiar in this connection, and including Dr. Theiler, of the Transvaal. The chief method of combating these diseases appears to be—waging war against the intermediate host of the protozoa, viz., various flies and ticks. In some cases preventive inoculation is permissible. It was recommended that an International Bureau of Tropical Diseases should be set up consisting of representatives of all countries concerned, and that the bureau should issue a bulletin giving results of all recent International publications dealing with tropical diseases of animals. In this way much energy could be concentrated.

The second subject discussed was, "The Government Control of Sera and Bacterial Products and their Preparation by the Government." Three papers were presented. The two main points discussed were as to whether the preparation of sera and vaccines should be conducted solely by the State as in Holland, or whether, as in Germany and in France with reference to sera, &c., for human application, the State should exercise control over the agents manufactured by private firms or individuals. After discussion of the various *pros* and *cons*, the following resolution was unanimously adopted: "In the

absence of direct State preparation of bacterial products for use in veterinary medicine the preparation of such products should be placed under the control of the State."

On Friday morning at 9 o'clock the chair was taken by Professor Perroncito, of Turin, and the first subject discussed was, "Avian Tuberculosis in its Relation to Mammalian Tuberculosis." Papers were presented by such eminent authorities as Professors Arloing, O. Bang, Möhler, and Washburn, while Perroncito, Van Es, and others entered into the discussion.

After detailing his numerous experiments and discussing the various points of the question, Arloing sums up as follows:—

(1) Avian tuberculosis is not a special disease, distinct from tuberculosis of mammalia.

(2) Its infectious agent is simply a variation of the bacillus of Koch, with which it is connected by a common primary character, and from which it distinguishes itself only by secondary and moreover inconstant properties.

(3) The avian variety itself is subject to variations like the human and the bovine bacillus.

(4) These variations allow avian bacilli sometimes to vegetate in mammalia, and bacilli of mammalia directly to infect birds.

(5) As to the anatomical pathological character of avian tuberculosis, it causes a special reaction of the tissues of the birds suffering from tuberculosis inflammation.

(6) The avian bacillus, being simply a variety of the bovine tuberculosis bacillus, in some cases capable of infecting mammalia, it stands to reason that, with regard to avian tuberculosis, the same preventive measures should be applied as are taken against tuberculous meat.

Mr. Oluf Bang sums up with the statement that "There is not sufficient foundation to regard the avian tubercle bacillus as a distinct species. The mammalian tubercle bacillus, after a prolonged residence in hens, becomes identical with the avian tubercle bacillus. It is difficult to convert the avian form by passing through mammals, yet in a few cases it has been successfully done. Möhler and Washburn conclude that: Tubercle bacilli of one species may be transmitted to an animal of another species, or to man, which fact makes it apparent that any preventive methods for controlling tuberculosis, to be successful, must take into consideration all species of animals that are susceptible to tuberculosis. These investigators also proved that "the eggs of tuberculous poultry may contain bacilli virulent for mammals, and ought to be regarded as dangerous unless cooked." Eventually Arloing's conclusion No. 6 was put to the meeting and unanimously accepted.

The next subject discussed was, "Sterility of Cows and its Dependence upon the Infectious Diseases of the Genital Organs." Two papers were presented, and after discussion the following resolutions of Professor Hess, of Berne, were adopted:—

"(1) There is an intimate relationship between sterility of cows and contagious diseases of the genital organs, particularly vaginitis, and infectious follicular metritis.

"(2) That it is necessary to establish research stations to deter-

mine clinically and experimentally the exact influence of these infectious diseases on the fertility of bovines."

Professor Hess found that out of one hundred cases of barrenness in cows, fifty-eight were due to catarrhal vaginitis. The obvious treatment, of course, consists of antiseptic irrigation, and, where necessary, with the addition of dilatation of the os uteri.

On Saturday morning Professor Arloing, of Paris, occupied the chair, and the first subject discussed was, "Government Efforts against Tuberculosis with Regard to the Ways of Infection in this Disease." Papers were presented by Professor Bang, Professor Dewar, Professor Ostertag, and Dr. Poels. Homage was paid to Bang for the great work he has done in this connection, enabling private enterprise to combat the disease, but it was resolved that control of tuberculosis should be established under central direction in order to get uniformity.

The second subject was on "The Construction of Cowsheds in Relation to Hygiene," and three papers were presented, including one by Mr. J. S. Lloyd, of Sheffield. The Dutch system was strongly recommended, and, from what I was able to see later in a large model farm, this method has very much to recommend it.

On the afternoons of Thursday and Friday the Congress was divided into five sections, dealing with various subjects simultaneously.

Section I. on Thursday discussed "The Inspection of Fish and Game, &c." (two papers), and also "The Insurance of Stock in Relation to Obligatory Meat Inspection" (three papers). On this point it was decided that "it is desirable that such insurance should be organized by the State in the interests of butchers and agriculturists." On Friday was discussed, "Disinfection of Vehicles of Transport" (two papers), and also "Sero-therapy and Vaccination for Foot-and-mouth Disease" (five papers).

Section II. on Thursday afternoon discussed "The Diagnosis of Infectious Diseases by means of Recently-discovered Reactions of Immunity (except Subcutaneous Injections of Tuberculin and Mallein)." Six papers were presented, and dealt especially with local reactions, as ophthalmic and intradermic, agglutination, and fixation of the complement. It would seem that these methods may all be very useful, and especially the ophthalmic reactions. They, however, require further study before being introduced into general practice, and resolutions were passed to that effect.

The second subject was on the "Etiology and Pathogeny of Malignant New Growths." Three papers were presented, the most important undoubtedly being that of Dr. Bashford, who also gave a demonstration of malignant tumours of various animals. He paid a great compliment to the veterinary profession for their work in this connection, referring especially to Jensen, of Copenhagen, and to McFadyean. He stated that cancer is neither congenitally nor hereditarily transmitted, and is in no way infective as that word is applied at the present time, and immunity can only be produced by cancerous or normal tissues of the same species or even of the same individual.

On Friday afternoon this section discussed first "Vaccination against Tuberculosis," and six papers were presented on this subject. It is well established that some degree of immunity can be produced by vaccination against tuberculosis, but no method yet introduced is accepted as quite satisfactory. Van Behring's "Bovo-vaccin" and "Tauruman" of Koch and Schutz, both intravenous injections, fail on account of the short duration of immunity, inability to re-vaccinate, and the danger to the person using them, since they both consist of virulent human tubercle bacilli. The method of Heymans (of Ghent) is well spoken of. By this method the vaccinating organisms of human origin are enclosed in a small reed-bag protected by collodion and are inserted subcutaneously. The vaccination can be repeated with safety as often as one wishes. The method of Klimmer, of Dresden, consists of subcutaneous injections of attenuated non-virulent preparations of human bacilli, and can be repeated if necessary. Both Heymans and Klimmer claim to have inoculated 20,000 head without loss, but it remains to be seen what degree of immunity is conferred.

Vallée, of Alfort, is of opinion that serviceable immunity is most likely to be obtained by administration by the mouth of not very virulent human bacilli to young animals. He says that no definite conclusion can be made with respect to the various methods discussed, and that only a systematic application will allow us to decide their proper value.

The second subject was "Pathological Diagnosis of Rabies." Three papers were considered, and the conclusion unanimously arrived at is that the presence of Negri bodies in brain substance, as best shown on staining by Van Giesen's method, is diagnostic of rabies, and can be shown in over 90 per cent. of animals affected. In cases where these bodies are demonstrated it is unnecessary to proceed to inoculation.

Section III. met on Thursday under the presidency of Professor Dewar, and first discussed "Specific Chronic Enteritis of Cattle," (Johne's disease), on which subject six papers had been prepared. There is considerable divergence of opinion as to whether or not the bacillus of this disease is a variation of the tubercle bacillus. Some think it is the avian bacillus, some that it is bovine bacillus becoming saprophytic, and others, including Bang, McFadyean, and Miessner, regard it as an entirely different entity, although Mr. Oluf Bang, of Copenhagen, has found affected cows free from ordinary tuberculosis to react to tuberculin made from avian tubercle bacilli. In any case it was recommended that similar steps should be taken against it as against cows affected with open tuberculosis, &c. They should be slaughtered, for undoubtedly the chief means of spread is the dung of affected animals.

The next subject was "Infectious Pleuro-pneumonia of Horses," with four papers. On Friday this section discussed "Hæmostasis in the Modern Methods of Castration," seven papers being presented, including one by Professor Macqueen, which we reprint in this issue of the VETERINARY JOURNAL. The various methods were discussed, but no new method was introduced.

The section then proceeded to discuss "The Pathology and

Therapeutics of Streptococcic Infections in the Domestic Animals" (four papers), and differences of opinion were expressed as to the efficiency of antistreptococcic sera. After this followed a paper on "Chronic Deforming Arthritis of Horses."

Section IV. on Thursday discussed two papers on "The Physiology of Milk Secretion," and one paper on "The Influence of Various Foods or Quality of Meat and Milk." On Friday a paper on "The Prevention of the Prejudicial Effects of Forced Breeding for Special Purposes," and three papers on "The Teaching of Zootechny."

Section V. discussed matters relating to "Tropical and Colonial Diseases," as embodied in nine papers, including one by Professor Gilruth on "The Control of Animals in Health and Disease in New Zealand."

The closing Session took place on Saturday afternoon, and the Minister for Agriculture was again present.

The President and His Excellency both offered hearty thanks to all who had assisted in making the Congress such a brilliant success.

It was then decided that the next meeting of the Congress shall be held in London in 1914, and telegrams expressing profound respect were sent to the Queen, the Prince Consort, and His Majesty King Edward.

"The Budapest" Prize. It was decided to strike a medal to be paid for by funds left over from the Budapest meeting, to be awarded by successive Congresses as a recognition for original work, either theoretical or practical since the last preceding Congress.

After very hearty votes of thanks the Congress was declared closed, and the members either returned home or proceeded to see the country under favourable conditions as arranged by the Executive Committee.

HÆMOSTASIS IN THE MODERN METHODS OF CASTRATION.[1]

REPORT BY J. MACQUEEN, F.R.C.V.S., PROFESSOR OF THE ROYAL VETERINARY COLLEGE, LONDON.

NOTWITHSTANDING the inestimable value of antisepsis and its well-proved advantages in most branches of veterinary surgery, Listerism does not appear to be generally adopted in castration, this being, perhaps, the only important operation that continues to be practised with very scanty aseptic precautions. This indifference probably is due partly to the undeniable success which attends castration by rough-and-ready methods, and partly to the increasing popularity of the standing operation, in which rigorous antisepsis is very difficult or impracticable. But the commonest immediate danger of castration is hæmorrhage, and though a few veterinary surgeons consider that the prevention of bleeding is of as much importance as asepsis, most operators are careful to use clean instruments and clean hands. The possible occurrence of post-operative bleeding, which is mainly attributable to infection of the wound, should be sufficient, apart from

[1] A paper presented to the Ninth International Veterinary Congress, at The Hague, September, 1909.

other reasons, to secure the adoption of antiseptic methods. Hæmorrhage from the testicular artery is prevented or arrested by a variable process of provisional obstruction produced by compression, laceration, or rupture, with more or less contraction and inversion of the middle and internal coats, stasis, and usually thrombus formation. The injury to the vessel is followed sooner or later, according to the method employed, by plastic arteritis and permanent closure of the artery by fibrous tissue derived from elements furnished by the vessel-wall and by cicatrization of the end of the cord.

Hæmorrhage immediately following section of the cord suggests failure of the means employed to prevent it, or some error in operation. Secondary hæmorrhage, though less common since the advent of antiseptic methods, may be due to infection of the injured artery, with arrest of the process of repair; infection of the clot, which breaks down, insufficient blood supply to the obstructing tissue, violent straining, rough handling, or restlessness of the patient, or, occasionally in old horses, disease of the vessel-wall. Slight secondary bleeding may be arrested by douching with cold water or by packing the scrotum. When hæmorrhage is profuse the cord should be traced and the bleeding stopped by ligature, clamp, or torsion. The finding of the cord seldom offers much difficulty, but sometimes it recedes into the abdomen, and the patient bleeds to death.

In the modern methods of castration, hæmostasis is effected by (1) clamp, (2) cautery, (3) torsion, (4) ligature, (5) écraseur, (6) castrator or emasculator.

In operation by clamp, provisional hæmostasis is produced by compression of the tissues of the cord, laceration and welding of the coats of the vessel, and the formation of a coagulum. Clamps of hard wood (elm, boxwood, oak) are employed. The internal or opposed surfaces are plain or grooved, and either undressed or medicated with caustic or antiseptic pomade or adhesives, containing copper sulphate, arsenious oxide, zinc chloride, or corrosive sublimate. Clamps sometimes have the opposed surfaces coated with oil of tar and covered with finely powdered mercuric chloride. The value of the medication is somewhat doubtful, but those who use dressed clamps maintain that the antiseptic dressing ensures perfect hæmostasis, prevents post-operative swelling, and promotes healing of the stump. However this may be, the fact remains that equally satisfactory results can be obtained by using plain or undressed clamps. Usually the clamp is applied to the uncovered cord, occasionally, as in hernia, to the covered cord; and after the clamp has been secured by tying with strong silk twist or whipcord, or by the application of a leather ferrule, rubber ring, or brass fastening, the cord is severed about half an inch from the clamp. After an interval of twenty-four to forty-eight hours the clamp is removed. Bleeding may follow operation by clamps which are warped, insecure, or not tight enough; or the cord having been severed too close to the clamp, the artery may recede from its grasp, and occasionally the horse, in an effort to remove the clamp, tears the cord. Secondary hæmorrhage sometimes occurs at the time the clamps are removed, owing to too much force being employed, or subsequently from infection of the clot, which quickly disintegrates. The clamps should not be pulled off. It is safer to cut the fastenings and allow the clamps to fall.

Clamps have been condemned as unsurgical, seldom aseptic, exposing the wounds to infection, unnecessarily painful, and inconvenient. But with no desire to controvert these or other objections, clamps in good condition and properly applied may be considered as safe and effectual in preventing hæmorrhage, and of great advantage in the castration of robust and aged horses, in either the standing or recumbent position.

Hæmostasis by cauterization, denounced by Ambrose Paré as a "cruel and barbarous method," is very frequently resorted to in castration. The actual cautery, carefully used, arrests bleeding by causing contraction with inversion of the coats of the artery, thrombosis, and the formation of an eschar. In practice the testicular cord, covered or uncovered, is held by a fixation clamp of wood or steel applied 2 in. above the epididymis, and the cautery, heated to a bright red, is used to sever the cord within $\frac{3}{4}$ in. from the clamp. After section has been completed the cautery is directly applied to the end of the testicular artery, and, if necessary, to the artery of the cord. Hæmostasis is then tested by slightly relaxing the clamp, and if bleeding occur the cautery is reapplied. The vessels should be briefly and lightly touched, as prolonged or forced contact of the cautery may remove the eschar. With the object of increasing the thickness of the eschar, powdered resin is sometimes applied to the surface of section and melted with the cautery. No doubt the resin strengthens the eschar and protects the cord, but in effecting hæmostasis by cautery more reliance should be placed on the contraction and inversion of the coats of the artery than on the thickness of the eschar, which mainly serves to support the obstruction within the lumen. Some operators sever the cord with the knife and apply the cautery only to the surface of section, but a more rapid hæmostasis follows section by the cautery. For this purpose the wedge-headed iron, visibly red, but neither glowing nor incandescent, should be held steadily—without sawing movements—with the edge applied across the cord. With the cautery immediate hæmorrhage should not occur, but the cord ought not to be released until pressure applied to the stump produces no oozing from the vessels. Sometimes, as when section of the cord exposes several arterial loops, hæmostasis is difficult, and repeated application of the cautery may be required; and occasionally in aged stallions, owing to the flaccid condition of the vessel or other cause, the cautery fails to arrest bleeding. Secondary hæmorrhage is very rare, though it may occur in consequence of too early separation of the eschar, infection of the end of the cord, or extensive sloughing brought about by too vigorous application of the cautery. Superficial sloughing of the end of the cord follows light touches of the dull red cautery, but the sloughs are small, generally aseptic, and harmless. Opinions vary as to the best temperature of the cautery for hæmostasis. A white heat has been recommended, but the incandescent cautery acts too quickly; it cuts the cord like a knife, and applied to the end of the artery it kills when it should only wound.

Torsion methods vary considerably, and in most only mediate torsion of the vessels of the cord is attempted. Hæmostasis can be effected by twisting the cord until it ruptures, or by immediate torsion of the artery—a procedure sometimes resorted to when bleeding has not been arrested by cautery, écraseur, or other instru-

ment. Mediate torsion prevents bleeding by slow rupture of the cord, the artery being stretched and lacerated in the process; the intima and media becoming inverted induce clotting, while the twisted adventitia forms a long cap over the end of the vessel. Torsion may be practised on the covered or uncovered cord. Operation on the covered cord should be preferred, as there is less risk of peritoneal infection and hernia. Usually the cord is firmly held transversely by a fixation clamp, while a torsion forceps, applied within ½ in. of the clamp, twists the cord in one direction until it ruptures. On removing the clamp the artery—reduced to a fine thread—should not bleed. When immediate bleeding occurs it may be due to the untwisting of the adventitia, to its rupture above the inverted coats, or to the force of the blood overcoming the resistance of the obstruction. Secondary hæmorrhage arises nearly always from infection of the stump.

A mixed torsion method, though little practised. may be mentioned. It consists of the application to the covered cord of a fixation clamp, section of the cord by the knife about 1 in. from the clamp, and direct torsion of the testicular and cremasteric arteries by Assalini's or other artery forceps. Hæmostasis by torsion of the cord has its merits and supporters, but it is not very popular. It can be defended as a fairly safe though somewhat rough method. It is impracticable in the standing operation, and for that reason its employment is not likely to extend.

Direct ligation of the testicular artery prevents bleeding by transversely dividing the internal and middle coats, which retract and curl up within the vessel and induce thrombosis, while the external coat, tightly embraced by the ligature, holds the internal coats in contact and supports the coagulum. In mediate ligation the vessels are forcibly constricted, their inner coats more or less lacerated, and clotting occurs above the ligature.

Hæmostasis by aseptic ligature may be practised by transfixing the covered cord in front of the vas deferens with a needle carrying a double thread and ligating separately the anterior and posterior portions; by ligation of the entire cord, or by immediate ligation of the artery after incision of the serous membrane of the uncovered cord. The ligatures—aseptic Chinese twist, plaited silk, or chromic gut—having been secured and their ends shortened, the cord is severed within ½ in. of the ligature.

Hæmostasis by ligation of the entire cord is serviceable in the castration of the bull and the smaller animals, but for the horse the first procedure, by tying the cord in two portions, is preferable. There is no danger of the ligatures slipping, bleeding from the artery of the cord is prevented, and the cord being covered there is little risk from post-operative hernia.

Immediate ligation of the testicular artery is less satisfactory. In exposing this vessel care must be taken to extend its flexuosities and to apply the ligature at a point which will prevent hæmorrhage after section of the cord.

Hæmostasis by aseptic ligature is the ideal procedure, but in castration its many advantages have not met with the recognition they deserve. Before the days of aseptic ligatures this method was often tried with most unfortunate results. Peritonitis and tetanus

frequently occurred, and though in the light of present knowledge these and other complications might have been expected, they were not then attributed to infection or to the condition of the ligature. In aseptic castration the ligature has given full satisfaction, but aseptic castration does not strongly appeal to the practitioner who finds himself obliged for a limited fee to castrate unbroken colts in the most expeditious manner. Hæmostasis by aseptic ligation is a sound surgical procedure, and of considerable advantage in the castration of aged stallions, but it requires more careful attention to technique than most veterinary surgeons can afford to give to the operation. Besides, operators hesitate to replace well-proved methods by others, however promising, and although this attitude cannot be wholly commended its effect probably will be that, while ligation may continue to be proclaimed as the procedure of choice, only a few will be found to adopt it in the castration of horses.

In linear crushing by the écraseur, hæmostasis is produced by contusing constriction of the cord. Under the strain the tissues are more or less intertwisted, the less resistant coats of the artery being torn and retracted, and a coagulum forms within the vessel. In castration hæmostasis by linear crushing is less certain than most other methods. It is true that many veterinary surgeons have employed the écraseur with little or no inconvenience from hæmorrhage, and in cryptorchid castration it is seldom at fault; but in ordinary castration by experienced as well as inexperienced hands the écraseur often fails to effect definite hæmostasis, and operation by crushing the entire cord, crushing both cords simultaneously, or by twisting the cord before crushing, may be followed by immediate or secondary hæmorrhage. The bleeding may be trivial or considerable, and though in some cases it may cease spontaneously, in others it continues, alarming the horse-owner and bringing discredit on the operation. Immediate bleeding has been attributed to too rapid crushing, faulty position of the chain, the loop embracing the cord obliquely, using a chain with a sharp edge which cuts more than it crushes, dragging the cord while crushing, &c. Doubtless one or more of these may be accepted in explanation of some failures, but singly or collectively they are hardly sufficient to satisfy the operator in cases where the chain on one cord succeeds admirably, but on the other fails in preventing bleeding. Slow or intermittent crushing is not more constantly certain than rapid crushing; both may succeed, or either may fail, in effecting hæmostasis. The condition of the chain-edges, which ought to be quite blunt, is of more importance probably than the speed of crushing. While only a qualified appreciation of linear crushing based on the use of the écraseur with screw-action has been given here, it is possible that Chassaignac's instrument, with alternate unilateral motion of the chain, may be more efficient in hæmostasis.

In broad crushing of the cord by the castrator or emasculator bleeding appears to be prevented by bruising the vessels, thrombus formation and reciprocal welding of the crushed parts. The best-known "castrators" are the "Reliance" (Arnold and Sons, London) and the "Huish-Blake" (Huish and Co., London). In closing the "Reliance" shears, the blades—curved, grooved, and toothed—crush and cut the cord at the same moment, while the "Huish-Blake" castrator, with serrated blades—one curved, the other straight and slotted—crushes before it cuts the cord.

The procedure varies with the age of the subject and the condition of the cord. The whole cord may be placed within the grasp of the instrument, or the posterior portion may be severed with the knife, and the castrator applied only to the vascular cord, or the posterior and anterior portions may be crushed separately in the order indicated. The last procedure should be followed in the castration of grown horses, in which the small testicular artery may bleed after section without crushing of the posterior portion of the cord.

The castrator in action is rapid, humane, and generally satisfactory, there being little bleeding, and it is equally serviceable for operation in the standing and recumbent positions. Many thousands of horses, bulls, and other animals in England and the Colonies have been successfully castrated by broad crushing, which, in the standing operation, is becoming increasingly popular as a very convenient and expeditious method of effecting hæmostasis.

DETERIORATION OF FOODSTUFFS.

BY CAPTAIN GAMBLE, F.R.C.V.S., CAHIR, CO. TIPPERARY.

In the September issue of the Veterinary Journal, an account was given by the present writer of various organisms found affecting foodstuffs. In this section it is proposed to discuss some of the effects of micro-organisms and mould fungi upon foodstuffs. It was intended, had there been more time, to have carried out a series of experiments on the same lines as those of König, Spreckermann, and Bremer; but unfortunately I had to return to my station, where there was neither time nor the wherewithal to carry them out. A translation of the above writer's experiments was very kindly lent to me by Mr. J. Hanley (Messrs. Bibby's, analytical chemist) at Liverpool, and from this translation the following deductions were taken:—

Bacteria are a pathogenic species, and hence foodstuffs attacked by them are looked upon as pernicious and objectionable; but whether or not the objectionable character of decomposed material is brought about by mould fungi as well as bacteria has not yet been definitely determined. "The kinds of decomposition undergone by these materials, as well as their nature, under varying conditions of storage, &c., are but little understood, so there are strong reasons why an attempt should be made to answer these questions." Experiments were carried out by these three writers and others with the objects of determining in what manner the individual organs set up decomposition in the foodstuffs under differing conditions, and to find out whether the resulting altered materials are pernicious.

When attacked by mould fungi, the proteid material undergoes no loss, only the pure protein loses, and correspondingly increases the protein combinations soluble in water. Alcohol and ammonia are not formed as a consequence of the moulding; the former results from yeast fermentation, and the latter is a decomposition product of protein and bacteria.

R. Scherpe investigated rye and wheat in this connection, and found that the loss through weak moulding amounted to between 3·0 and 6·6 per cent., and through well-developed moulding the average in three varieties of rye was 45 per cent. In three varieties of wheat

under equal conditions the average loss was 32 per cent. Contrary to the results obtained in the above-mentioned investigations, Scherpe found that the nitrogen of the protein *had* a share in this loss, the diminution in nitrogen amounting to be: in the case of weak moulding, rye, 6 per cent.; wheat, 3·2 per cent. In the case of strong moulding, rye, 7·17 per cent.; wheat, 2½ to 10 per cent. Scherpe observed in the case of strongly moulded corn a considerably higher percentage of ammonia than in sound corn. The degree of acidity was considerably raised by weak moulding, whilst the cellulose, under the influence of the moulding, suffered an increase.

König, Speckermann, and Bremer repeatedly observed a considerable loss of fat in foodstuffs rich in fat when kept under certain conditions. For example, in oil-cake, or oil-cake meals, which had been kept for from six to twelve months, the amount of fat had diminished from 10 or 12 per cent. to a few percentages. Reitmayr found that in earthnut cakes which had been kept getting mouldy for two years the fat had sunk from 11·90 per cent. to 0·56 per cent. Ritthausen and Baumann stored away two rape-seed cakes for two years in closed glass vessels, and found in the completely moulded mass the following:—

RAPE SEED CAKE (1).

	Water	Fat	Fat in the dry substance
When fresh	12·45 per cent.	10·45 per cent.	12·02 per cent.
After two years	21·99 ,,	1·98 ,,	2·53 ,,

and in the second sample:—

RAPE SEED CAKE (2).

	Water	Fat	Fat in the dry substance
When fresh	12·31 per cent.	8·50 per cent.	9·69 per cent.
After two years	23·42 ,,	1·87 ,,	2·44 ,,

The considerable decrease in the fat of the rape-seed cakes was attributed to the life-work of the moulds, and there were recognized in the rape cakes which had been kept for two years no less than fifteen distinct species of micro-organisms; but their power of fat absorption was not gone into more closely. Similar observations upon the decrease of fat during the storage of the residues from the pressing of olives appear to have been made, since Klein recommended that, in order to avoid the loss of fat in the olive pressings, the latter should be dried rapidly, or, being soaked with the fruit water, they should be strongly pressed or put through rollers. He claims that this treatment does not allow of any extensive mould growth, but gives no explanation of the decrease in fat.

Searching investigations upon the decomposition of fat with analytical results were published by Schmidt. These go to show that *Aspergillus niger* can obtain its total carbon requirements from oil of almonds or free oleic acid. Out of 0·294 gramme of oil of almonds, 0·285 gramme, or 96·93 per cent., was destroyed by *Aspergillus niger*

in forty-five days. After these observations it can no longer be doubted that fat can be absorbed by micro-organisms.

In an experiment to determine the influence of different amounts of moisture upon mould growths und decomposition, König, Spreckermann, and Bremer took 1 kilogramme of cotton seed meal and mixed it with different quantities of water, viz., 50, 100, 200, 300, 400, 500, and 600 c.c., and, in order that the normal conditions should be imitated as closely as possible, they were kept for seventy-four days (from June 13 to September 25) in small linen bags, and at the ordinary room temperature. The results obtained are given in the following table:—

OF EACH ONE KILOGRAMME OF COTTON SEED MEAL AND WATER.

(I.) Natural or ordinary cotton seed meal	(II.) 50 c.c.	(III.) 100 c.c.	(IV.) 200 c.c.	(V.) 300 c.c.	(VI.) 400 c.c.	(VII.) 500 c.c. and (VIII.) 1,000 c.c.
The meal contained only a few bacteria and mould spores	No increase of the micro-organisms.	Bacteria not increased. Very strong development of 2 Oïdium and secondary series *Penicillium glaucum*.	Bacteria not increased. One of the Oïdium species described under III. predominated. Less abundant and in approximately equal numbers were *Penicillium glaucum*, *Eurotium repens*, and *Rhigopus nigricans*.	Bacteria had developed strongly. It was observed that two species belonging to the potato-bacilli group predominated, also the species of Oïdium seen in Sample IV. was strougly represented. There were in addition individual specimens of *Aspergillus flavus*	Strong development of the potato-bacilli species Only *Aspergillus flavus* was present of the moulds	Exclusively bacterial growths. The moulds had only established themselves at the edges, probably owing to the gradual drying.

This last experiment shows very clearly indeed what influence a different proportion of water has upon the growth of the micro-organisms present in a particular sample. In the presence of a low water content (up to 11 per cent.) absolutely no increase in their number took place; in the presence of a mean proportion of water (14 to 30 per cent,) mould and Oïdium species predominated and increased, whilst the bacteria were the primary product in presence of 30 per cent. of water and above.

In conclusion, it may be mentioned that in my experiments *Aspergillus niger* was not found, this mould being one of the causes of *Pneumomycosis aspergillosis*. In this connection an interesting sample of hay which was alleged to convey anthrax was examined at the Liverpool University, guinea-pigs being inoculated with an infusion from it. Several of these animals died within twenty-four hours from putrid intoxication, and subcultures on glucose agar from their subcutaneous tissues yielded in one case *Aspergillus niger*. Possibly the spores of the fungus were introduced from the hay with the infusion, and remained unchanged in the subcutaneous tissue of the guinea-pigs until after death, and were then transferred to the more favourable culture medium (glucose agar), when the spores germinated, and a typical *Aspergillus niger* was produced, which I had the opportunity of examining under the microscope.

AUTO-POISONS.[1]

BY HENRY SUMNER, M.R.C.V.S., LIVERPOOL.

In accepting the honour to prepare a minor paper for the meeting of the National Veterinary Association, I made two serious mistakes, in that I presumed to write upon a subject which I find is enormous, and also in that I failed to realize that my time for such preparation was very limited. However, I trust that the epitome of the subject which I offer may be productive of interest and provoke what is the desire of all essayists, an animated discussion.

The term auto-poisoning or auto-intoxication is applied to those morbid conditions of animal life which are associated with the production of unusual organic compounds or extractives which simulate in composition some of the by-products of microbic activity, but remain yet to be accurately described, probably by reason of the fact that such compounds or extractives are numerous and their points of chemical difference small.

Not only do these bodies simulate the microbic by-products in composition, but in certain acute forms they offer to the clinician many of the expressions of constitutional disturbance which are associated with the better-known microbic invasions.

As these bodies are the product of disturbed normal metabolism, it might help us to consider what is meant by that physiological process.

According to Hoblin, whom we may consider a reliable authority, metabolic force is a term applied by Swann to "the force or power possessed by living cells of changing the character of the substances which are brought into contact with them." Consequently, in health these bodies are kept under control and prevented from accumulating in the tissues in which they are formed, and where, probably, by their residence they undergo further changes and become infective principles. In normal conditions these bodies—

(1) Are eliminated in the urine, fæces, &c.

(2) Enter into combination with other bodies, forming harmless compounds, or

(3) They become chemically altered into non-toxic or relatively innocuous bodies.

Therefore, when such normal processes are interfered with, these otherwise harmless bodies become operative at the expense of the animal's health, and such processes may be divided into—

(1) Defective elimination due to some disorder of the excretory organs.

(2) Failure of chemical neutralization through disease or derangement of the organs responsible for such processes, *e.g.*, liver disease.

(3) Failure in the chemical transformation of the metabolic products, resulting from abnormalities in the functional tissues, or through a checking of the normal steps of metabolism by the failure of elimination of the end-products.

(4) Excessive formation of certain normal products of metabolism, *e.g.*, hyperactivity of the thyroid.

[1] Read at the meeting of the National Veterinary Association at Harrogate.

(5) Production of abnormal toxic chemical substances, *e.g.*, the intoxication following superficial burns.[1]

Many varied opinions have been expressed as to where the line should be drawn between auto-intoxication depending directly upon the retention of the altered metabolic products, and that associated with the reception into the animal economy of such bodies as ptomaines; but for our purposes we will consider only such expressions of animal diseases as may appear to be the result of the retention of the altered metabolic products.

The auto-intoxication may be acute, in which we have very manifest constitutional disturbance; or sub-acute, in which there is no appearance of disturbance, but a condition of unthriftiness. The intoxication may be general, or confined to given areas. It affects almost every tissue of the body, and, if acute, is frequently associated with great disorganization of the function of the nerve centres.

Susceptibility is not confined to genus, sex, or age; it is general, but more particularly encountered in the early periods of life, and is largely dependant upon errors in dietary, hygiene, and exertion. Plethora, continued or transient, increases susceptibility, as also does anæmia.

Unlike microbic diseases, auto-intoxication recurs, and unless the animal is placed under more favourable conditions the attacks appear to increase in virulence.

Without attempting to go into the complexity and mystery of cell life and functions, it may be here remarked that it seems probable that, under certain conditions, the cells affected or disturbed in their functional activity may go on indefinitely secreting or excreting such bodies or extractives as we deem responsible for the production of auto-intoxications.

Sub-acute auto-intoxication is possibly one of the greatest predisposing conditions for the invasion of disease-producing organisms. As in the case of the ptomaine poisoning group, there are no recognized anti-bodies or properties produced as a result of the auto-intoxication. It is an individual disease, and cannot be conveyed to other animals of the same group, although many individuals in a given place, presumably under similar conditions, may be affected at the same or succeeding time.

In the first two groups of Wells'[1] cases are of every day occurrence in veterinary practice—in failure of elimination in diseases of the kidneys, more especially in dogs, and in diseases of the liver, to which possibly we do not give adequate recognition, as it is seldom one makes a *post-mortem* examination of a town worked and fed horse without appreciating the fact that the liver—of all the organs—exhibits pathological characters which have not been associated with any particular symptoms during life. I refer to cirrhosis and fatty degeneration.

In the third group I think we can class what to me appears the more interesting expressions. I refer to azoturia, or the so-called hæmoglobinuria, and I would also add lymphangitis of equines—both being confined to certain areas with constitutional symptoms—and to the common town fever of horses (which have been brought in from the country) as an illustration of a general auto-intoxication.

[1] "Chemical Pathology."

Azoturia (*hæmoglobinuria*) is an equine disease, and is characterized by a great disturbance of nervous function, both local and central, which is accompanied in most cases by the presence of blood-colouring matter in the urine. It is a disease of the plethoric group, and appears to be dependent upon exertion. In a sense it appears confined to females and geldings. I have never known a case in an entire, notwithstanding all the apparently predisposing elements which occur in the lives of the males of any of our breed groups. The age seems also to have some influence on the disease—it appears generally in early maturity, and is more prevalent in the spring, which period is usually associated with a redundancy of vital force. One attack does not confer immunity, rather in the milder cases seems to create a susceptibility in that such cases frequently recur for quite a period of time.

In searching for the true pathology, our thoughts are divided into the two definite expressions, nervous and circulatory. As in all cases it is manifestly an interference in the action of some muscular group, and is attended with constitutional disturbances, I think we may be justified in assuming the generation of some organic extractives within the muscular tissues, such bodies being speedily taken up by or conveyed to the nervous ganglia, and even to the great nervous centre; for in many of the most acute and unfortunately fatal cases convulsions and even delirium are present, in my experience, before the coming of the blood-colouring matter in the urine. In more than one case of the acute form such an expression has been delayed for twenty-four or thirty-six hours, and has been attended by some relief of the toxic manifestation. I have known cases with all the local and general symptoms of this disease die in delirium within twenty-four hours without having passed any urine containing the broken-up hæmatin.

Equine lymphangitis (Weed) is a disease in which to my mind a local auto-intoxication seems an acceptable pathology. Again this is a plethoric disease with both local and constitutional disturbance. It definitely recurs, and in later life, owing to the great interference with mobility, passes from the plethoric to almost the opposite condition of the body. If we accept the theory of the power or probability of cells continuing to exert their altered function, it seems probable in this disease that the *materies morbi* is always present, and speedily shows its influence if conditions of bodily habit in food and circulation are suitable for its toxic influence.

It is the common and successful practice to treat these cases in such a way as to lessen the redundance of the system by withholding stimulating foodstuffs and giving exercise on every high day and holiday.

Town fever seems a disease which is general and not local in its manifestation. The Pasteurella have the credit of being the operating causes, and may be so, but it seems curious that we can have a definite temperature of 106° F. at night and an absolute declension within twelve hours. The recurrence, which is such a known attribute, seems to suggest to me that this disease may be an auto-intoxication due to altered work, dietary and housing.

Milk fever of bovines also appeals as a local intoxication, in which the toxin is so frail as to be split up by the presence or pressure of air.

These organic compounds are, like the more definite toxins, amenable to the good influence of oxygen.

Rickets may possibly be a disease of a like cause operating in anæmic animals, as also those troublesome states of "ill doing" which we meet with, and which have such a similarity with pernicious anæmia in humans.

Therapeutics.

In the absence of definite knowledge as to the chemical reaction of the bodies which give rise to auto-intoxication, it appears probable that the administration of alkaline salts, particularly of soda and potash, seems to be indicated.

Wells, discussing some experiments of acid intoxication in rabbits, following repeated doses by the mouth of inorganic acids, brought about a condition in which the power of "internal respiration," as intercellular gas exchange is called, by preventing the removal of CO_2 from the cells, and in such cases there was little or no apparent cyanosis. The natural carrier of such CO_2 appears to be the carbonate of soda, which coming in contact with the CO_2 in the cells, becomes converted into the bicarbonate, and as such is carried to the lungs, where it yields up its extra carbonate and returns for further service. When the acids were introduced into the blood of the rabbit they formed neutral salts, which were eliminated by the kidneys, and did not set up any of those symptoms which were present when the acids were given by the mouth. Again, the alkaline group is much more likely to reach the tissues affected, and may combine with the metabolic products and form harmless compounds. Oxygenating influence also seems desirable, and where solutions cannot be injected such medicaments as are easily split up and possibly yield oxygen in the process, as the hyposulphite of soda, might with advantage be administered.

In chronic cases, where these milder remedies fail, good results have been recorded of the use of mercury, iodine and arsenic; a favourite treatment of equine lymphangitis after the acute stage has passed, being a somewhat continued course of the mercuric potassium iodide.

In practice the desirability of the interchange of these more drastic medicaments should be considered, leaving a short period between the medication of these agents or their compounds. In all cases, acute or chronic, the efficient discharge of the duties of bowels, liver and kidneys is essential.

Constitutional disturbances will call for particular treatment as they arise in individual cases. In preventive medicine we may include all that is grouped in the study of hygiene, assisted by medicinal means as seem best suited to the occasion.

Clinical Articles.

INTUSSUSCEPTION OF THE SMALL INTESTINES IN A COW.

BY J. F. CRAIG, M.A., M.R.C.V.S., PROFESSOR IN THE ROYAL VETERINARY COLLEGE OF IRELAND, DUBLIN.

THE subject of this affection, an aged red crossbred cow, in good condition, was admitted to the Royal Veterinary College of Ireland on June 13 last.

The *history* accompanying the case was that she had been ill for the past four days. With the rest of the herd she was pastured on a level field provided with fine, rich pasture. On the 9th it was noted that she appeared to be affected with colic, frequently rising up and lying down, kicking her abdomen with her hind limbs, bellowing frequently, and rushing about. She was then taken into the house, and after a few hours quietened down. Since that time until admission to the College she had received 2 lb. of Glauber's salts, 1 quart of linseed oil, 2 lb. of lard, and 4 lb. of treacle, as well as some aniseed, ginger, and other condiments. She had calved in April last, and consequently up to this time was in full lactation. Now the secretion of milk was in abeyance; she also ceased to feed and drink. The owner had drenched her at intervals with oatmeal gruel. The medicines had no effect. She had passed very little fæces since the onset of the attack.

Symptoms.—The animal appeared bright, and begun to grunt only when in the recumbent position. There was slight tympany on the left side. The animal did not ruminate. The temperature was 102·8° F., and the pulse 78, full and strong. On exploration the rectum was found to be empty and nothing definite could be ascertained. The arm when withdrawn was covered with a tarry evil-smelling semi-fluid material. A small quantity of the same material was also passed immediately afterwards. No indication or impression of increased tenderness was given on manipulation of the abdominal walls.

Treatment.—The patient was given a copious rectal injection of soap and water, and later exercised. She was placed in a loose box and a bucket of water left beside her, and at intervals she was offered linseed tea and a soft bran mash. She was given the following medicine three times daily in linseed gruel:—

℞	Sodii. hyposulph.	ʒii.
	Ammon. carb.	ʒiv.
	Nux. vom.	ʒii.
	Zinjib.	ʒiv.

M. Ft. Pulv.

Progress.—During this and the following days the cow did not ruminate, feed, drink, nor pass fæces. The grunting increased if she lay down, but this she seldom did, and when she did do so, with very great care. In the box she was not inclined to move. The temperature remained normal.

On the 14th, she received a rectal injection and the stimulant powders as before. The tarry material seen on the first day was also

discharged from the anus at the time of injection. In the evening she swelled up very markedly on the left side. A small portion of mucus was found on the floor of the box and believed to have been discharged from the rectum. The swelling became so great that it was thought necessary to tap the rumen and remove the gas; she was also given 4 lb. of treacle and 1 lb. of common salt.

When seen next morning the cow stood at one side of the loose-box with her neck stretched out, frequently grunting and sometimes coughing. She was distinctly swollen on the left and even on the right side. The eyes were slightly retracted into the orbits. Some greenish-yellow semi-fluid food was noted on the floor of the box, as if it had been vomited. The temperature was 101·4° F. The probang was passed and by it a great quantity of food similar to that noted on the floor was removed, but it gave no relief. A rectal injection was also given. As a last resort 1 grain each of pilocarpine and eserine were injected under the skin of the neck.

Thirty minutes after receiving these drugs the cow stretched out her neck more markedly than hitherto, and became affected with

Intussuscepted piece of bowel.

intense dyspnœa, grunting and coughing the while. She next began to vomit freely a greenish-yellow semi-fluid material, similar to that noticed before on the floor of the box, through the nose and mouth in large quantities. Fifty minutes afterwards the abdomen swelled up to an enormous size, the animal fell, rolled over on its side and died within a few minutes.

At the *post-mortem* examination the subcutaneous blood-vessels were congested and the blood formed a firm clot. There was a slight peritonitis. Numerous velvety pink granulations had developed over the peritoneum, especially on the great omentum. There was only a small quantity of yellow limpid fluid in the abdominal cavity, estimated at about a pint. The rumen, reticulum, omasum, abomasum, and the first portion of the small intestine were filled with a very soft, even semi-fluid food material. About 20 ft. in front of the cæcum the small bowel was the subject of an intussusception from before backwards; about 4 ft. of the intestine were involved. It was very thick and firm, and the portion which was hidden was gangrenous and even black, and covered with a thick fibrinous deposit. The passage through the telescoped bowel was entirely occluded. Hence in the

accompanying figure only the beginning, termination and middle portion are shown. The figure shows also the telescoped bowel in part exposed, because a piece of the outer portion of the intestines has been removed.

The bowel behind the lesion was empty. The trachea contained some of the material which had been vomited up from the rumen; the other organs were apparently healthy. The uterus contained a fœtus about seven weeks old. The cow had been put to the bull on April 24 last.

Remarks.—In this case no definite cause of the condition could be ascertained. No doubt it was due to some irregular peristalsis, but this movement must have had some exciting agent to account for it. No intestinal parasites were found. Perhaps some accident during progression which no one noticed may have accounted for the condition. The field on which the animal was grazing was nearly level, and there were no ditches into which she could have fallen. In a large proportion of recorded cases the same difficulty in ascertaining the cause has been experienced.

It is also worthy of note that in the cow the symptoms of the condition are only acute in the early stages. The explanation of this is that the intussuscepted bowel in a very short time becomes necrosed. In the case above recorded, even when brought to the College four days after the commencement of the illness, the only evidence of pain shown was an occasional grunt when the animal lay down. As for treatment, theoretically the correct course to adopt is the radical removal of the intussuscepted bowel, or if in the early stages, reduction of the intussusception after performing laparotomy. In the first place, however, one has to be quite certain of the condition before undertaking an operation of such magnitude, and even if the diagnosis were correct, because of the length of the bowel and its arrangement in coils one would have some difficulty in finding the intussuscepted bowel from a wound in the right flank.

How, then, might one recognize the condition? We meet quite commonly with cows affected with constipation for several days, and a great many of them recover after treatment with laxatives and stimulants. Some of the chief features of intussusception appear to be the entire absence of movement of the bowel after a couple of days, a fœtid tar-like discharge which smears the arm at a rectal examinations and no desire to feed, drink, ruminate, or move.

Sometimes one may feel the intussuscepted bowel *per rectum*, but one has to be careful not to mistake it for enlarged mesenteric glands, or for kidney.

If one makes a diagnosis, there are three methods of procedure to be selected from. One is a surgical operation, with a possible chance of success. The operation is commonly recommended, but no records are given of its success. The second method consists of expectant treatment. The bowel may slough away and the animal recover. Records of this result have from time to time been published. Last of all, if in the early stages and the animal in good condition, slaughter may be advised. This advice can only be taken before any toxic infection or peritonitis has been set up, or any drugs administered. In these circumstances it may be the most economic procedure from the point of view of the owner. The great drawback, however, is that the disease is probably not diagnosed until the later stages.

CASE OF DOUBLE SHOULDER SLIP.

BY T. F. PRIME, M.R.C.V.S., UPPER NORWOOD, S.E.

A MIDDLE-AGED, rather fat fox-terrier was brought to the infirmary, having been run over by a heavy trade motor, the dog being unable to stand and in a state of collapse.

On examination I found a small wound inside the right forearm, and an abrasion on the wrist. The visible mucous membranes were intensely pale, and at the time I attributed this to the effects of "shock." I bandaged and dressed the wounds, and gave the patient a stimulant, putting him in a quiet kennel. The next morning, finding that he appeared much brighter, I placed him on the ground in order to try to induce him to walk a few yards. I found that each shoulder blade projected for fully 2 in. above the level of the spine, thus letting the body down and giving the animal a most peculiar appearance, the legs being turned out and the body dropped. In fact I was compelled to place my hand under the chest to support the body, and thus to raise it before I could properly adjust the bandages. I kept the bandages tightly in position for about three weeks, the shoulders eventually returning almost into their normal positions.

The dog now runs about well, but the shoulders have more play on the body than usual; there is a large depression where the serratus magnus muscle is on the right side. No inconvenience seems to have been left from the accident.

ON THE INFLUENCE OF CONSTANT IRRIGATION WITH HOT WATER ON THE HEALING OF WOUNDS.

BY ALBERT KOHLSTOCK, D.V.M., SCHÖPPENSTEDT (BRUNSWICK).

IN the Inaugural Dissertation at Dresden the author discussed the physiological effect and the therapeutical employment of constant warmth in animal therapy. He conducted trials with Röders' apparatus to see how far the healing of wounds could be furthered by hot water irrigation. The water had a temperature of 38·5° to 42° C. Experiments gave very good results.

The following is a summary of the conclusions arrived at:—

(1) In constant irrigation with hot water the cleansing of the wound is very quickly accomplished; the necrotic bits of tissue and substances that hinder healing are soon cast off.

(2) The formation of pus is hindered or totally checked.

(3) By the water irrigation collection and decomposition of secretion on the wound surface are prevented.

(4) Granulation formation is encouraged and much hastened, especially in wound cavities and canals.

(5) Epithelial growth is greatly favoured.

(6) Great swelling is kept back.

(7) Irrigation should continue from six to eight hours.

(8) The most favourable temperature is from 40 to 42° C.

(9) Maceration of contiguous parts of skin has not occurred, or only to a small extent, in this method of treatment.

(*Berliner Tierärzt. Wochenschrift*).

Abstracts and Reports.

ROYAL VETERINARY COLLEGE, LONDON.

OPENING LECTURE OF THE WINTER SESSION.

BY PROFESSOR G. A. BUCKMASTER, M.A., M.D.

MR. CHAIRMAN AND GENTLEMEN,—It is with great pleasure that I follow the traditional custom of those who have preceded me in former years, and on behalf of the Governors, the Principal, and the Professors of this College, offer a most cordial welcome both to those who come among us for the first time to-day, and to those whose presence here is evidence that they continue to take a warm interest in this institution, which, both by its history and the work which it has accomplished, occupies a foremost position in the country. It is fitting that to all our Students, both old and new, this welcome should be particularly extended; for it is to them that we look to uphold the status of the veterinary profession, and by active interest promote the welfare of this College.

Now, though through no fault of my own I happen to be in a somewhat unenviable position, inasmuch as I cannot speak either with that knowledge or authority on matters which chiefly affect the veterinary profession, and the nature of my work, during the few months that I have had the honour of being connected with this College necessarily precludes a very intimate acquaintance with the various problems which confront the profession, it is doubtful whether there has ever been a more favourable opportunity than the present time for those who propose to commence veterinary work, and avail themselves of the quite unrivalled opportunities afforded in this College; and there are certainly no sufficient grounds in my opinion for the somewhat pessimistic views which from time to time I have heard expressed as to the gloomy outlook which exists for those about to enter the profession. Neither does there appear to me to be the slightest probability that the whole race of veterinary surgeons is about to suffer the process of painless extinction.

Apart from the actual treatment of disease in animals, an equally large field lies open to the veterinarian in what can be considered the furtherance of preventive medicine considered in its widest sense; and the attitude of the more enlightened portion of the public—who unfortunately do not always necessarily rule us, towards the aims of the veterinary surgeons, shows that they are quite aware of the dangers which may arise to the community from diseased meat or from the transmission of bovine tuberculosis and other communicable diseases either by meat or milk to man from animals.

Fortunately, from our point of view, the public—and it is to them that all professions must look for the means of subsistence—are imbued with a wholesome fear of bacteria or germ. Their knowledge of these is both wonderful and minute, and at the present time, just as the physician will find with almost every private man a complete pharmacopeal output of tabloid drugs, so it is far from uncommon for him to have to listen to a considerable amount of undigested information about the bacterial origin of various diseases.

Some of the daily papers, as a matter of fact, may be considered to be among our best friends; for they keep a somewhat credulous public

alive to the dangers of adulterated or contaminated food; and it is in the matter of the provision of milk and meat supply that an extended sphere of utility lies before veterinary surgeons; for I take it as granted that those whom I am addressing firmly hold the view that the trained veterinary surgeon is the proper person who should by reason of his special knowledge be qualified to give an opinion as to whether an animal intended to be slaughtered for food is healthy or not; and it is a reasonable demand that any efficient system of meat inspection of animals intended for food should be based on an examination which should be made both before and after slaughter.

As to the provision of our milk supply, dealt with so ably in former years by previous speakers, we also maintain here that it should be in our hands very largely; though the pure milk easily becomes contaminated after milking is well known, and thereby it becomes a source of danger to the community; but even if we concede all this, and the contamination does often occur owing to the want of proper storage, and especially in the poorer class of town dairy and the dwellings of the poor, this in no way invalidates the scarcely credible fact that at the present time, from a cow which is in the most advanced state of tuberculosis and exhibiting obvious signs of udder disease, some will, simply for gain, sell the same for human food so long as the sale has not been stopped on the certificate of a veterinary surgeon.

Now, to within a short time ago the greatest difficulty before the London Health Authorities in their campaign against tuberculous milk has been, that although they possess the power to condemn such milk when found in London, they have had no opportunity to enquire into the health of the cow supplying the milk if those cows belong to a farm situate without the County of London. In order to overcome this difficulty, as many of you perhaps know, a special Veterinary Inspector has been appointed to examine such cows, and to stop the supply of milk for human food if it is an animal suffering from tuberculosis of the udder. At present it is reckoned that possibly about 2 per cent. of cows furnishing milk in this country are affected with tuberculosis of the udder; and at present the London County Council has no authority to deal with other forms of tubercular disease. But when the recently issued Tuberculosis Order comes into operation, local authorities will be required to mature the order to slaughter not only cows suffering from tuberculosis of the udder or cows giving tuberculous milk, but also all bovine animals emaciated from tubercle.

As to the details of the work for the past year, and the work of the veterinary inspector, 372 farms, scattered over thirty counties, were visited. About 10,000 cows were examined: 262—that is to say 2·6 per cent.—were found to have tuberculous udders, and of the 1,217 samples of milk examined, 157, or 12·9 per cent., proved to be tuberculous. In the words of the Chairman of the Public Health Committee, the work of the past year has successfully advanced the good progress of the Council in their campaign for a pure milk supply. In previous years it was only possible to discover at much cost, and after weeks or months of work, that a given sample of milk taken in London was tuberculous. Now, even if it is impossible to completely stop the milk of tuberculous cows from being sold, it is probable that we can at least see that such milk does not come to London for sale.

Now these questions of meat and milk supply, or rather of meat inspection and dairy inspection, vitally affect everyone; and we must continue to claim that in this matter the best interests of the community will be served by the competent veterinary surgeon. I agree entirely with Professor Wooldridge, who in this place last year advocated either the creation of some definite diploma in public health or the granting of an additional certificate which will show that, apart from the subjects of the ordinary curriculum which of course even now includes a training in meat inspection and veterinary pathology, a veterinary surgeon who has made special and extended study of this matter shall have a specific certificate or diploma. In other words, I would advocate the creation of a special diploma bearing the same relation to the ordinary veterinary degree that the existing D.P.H. does to the medical profession, where a special post-graduate course over six months must have followed a course which is very largely of a practical rather than a theoretical character. I can speak about this because I remember quite well that when this diploma was instituted it was not very much coveted, and I think I can give you a reason for that; as in my own case, in 1887, I was a solitary candidate examined at Oxford for six consecutive days by six examiners. Of course this did not tend to make the examination particularly popular. If I may here venture to throw out a suggestion to-day, it would be that the veterinary profession should not wait, but that they should prepare for an important question which is certain in the future to arise, namely, a demand by the public authorities for specially equipped men to give their whole time to the subject of preventive veterinary medicine or science. I would here express the hope that at no distant time there will be established a veterinary service of public health which will stand in the same relation to veterinary surgery that the D.P.H. does to medicine, and that some additional distinction, either in the way of a diploma or certificate, should be granted to the R.C.V.S.

Among other considerations which have led me to refer to this question is one which is perhaps not at first sufficiently obvious, for in the veterinary, as in the medical profession, of those students who propose to enter there are various groups. First, there is the group of those men who never get qualified at all; and in my time—I will not say at which medical school—these formed about 15 per cent. of the total number who entered. Among those who did qualify, the majority were obviously fitted for active practice, but others, by the peculiar bent of their minds, and their scientific tastes, were far more adapted for the pursuit of other parts of medicine than the active practice of it; and it is for these in particular that I would appeal that some other form of certificate be granted. But I have no doubt that those at present engaged in veterinary study do find differences such as I have mentioned as existing in the medical professional. The student may prefer to qualify himself for special work of the veterinary surgeon, and in that case it seems fair that the additional time and study devoted to this matter should obtain recognition.

Now the success with which a profession is practised, the status that it holds, and the estimation in which it is held by the public, depend largely upon the loyal co-operation, rather than the competition of its members; but the actual advance of either the medical or

veterinary profession depends by no means upon the individual ability of those engaged in the active practice of it. I am far from willing for a moment in any way to attempt to minimise or belittle the practical side of any profession; but it is owing to experimental work, and I believe to this alone, much of which is of necessity carried on in laboratories, that we must look for those additions to accurate knowledge without which no progress at all is possible. It is true enough that there is a somewhat unfortunate tendency for a man engaged in particular work frequently to over-rate its importance or consider that his own researches are of far more importance than the researches of anybody else, But when all allowance is made for these foibles, there remains the undoubted fact that the whole laboratory output of the world is an expression of the desire for knowledge. The relation of scientific work to our profession I always think is represented by three sets of strata laid down at a river's mouth: the old deposit which has consolidated and become the basis actually of our knowledge; the overlying accumulation which represents what is largely destined to thicken the lower part on which it lies, but about which information is not quite so positive; and there is the superficial layer which represents what is called recent work. But it is clear that of the three strata, there is really only one stratum that is quite worthy of attention, and that the gradually-formed deposit by accepted knowledge must be of greater intrinsic value than the latest discovery or the newest theory. It is quite certain that knowledge about the most recent discovery, and most up-to-date, is really after all not much knowledge. By the consent of those who, from their knowledge, are alone capable of forming an opinion worth receiving, the claims of scientific research rest upon the clearest evidence. The inductive method is a matter of observation and experiment. Among other questions is this one: whether experiments should be of a popular or scientific kind. Now by "popular" I mean those experiments made upon a large scale upon human beings, as where contaminated water, meat, or milk supply is demonstrated to the community. There are plenty examples of this. I will instance of the scientific experiments the importance of those made many years before Cox's discovery. I refer to the experiments of Gerlach of Hanover, who in 1879 ascertained by actual observation in the laboratory that bovine tubercle could be communicated to animals either by flesh or milk.

Without troubling you by detail after detail, which would convincingly prove to anyone who possesses the faculty of understanding evidence that the work not only of those who initiated the study of bacteriology, but of those who have so greatly extended it, it is clear that this is due to an intimate knowledge of laboratory methods and technique; and although it is only three years ago since for the first time in its history this School received any grant to enable it to carry on its work, apart from what it has received by donations, subscriptions, and fees, more aid with which would be gratefully accepted, I would contend that the whole research work of the medical and veterinary profession should be financed in part by the State. As to the possibility, or even probability, of this we may have our doubts; but it would be a profitable investment for any State to finance original research by the equipment of laboratories and retaining the services of those who are capable of using laboratories; of this I have no shadow of doubt.

It is known in Germany and I can claim to have an intimate knowledge of Germany from a residence and knowing personally a fair number of exceedingly well-informed German people; and without holding any brief for Germany, I would like to point out one or two things which I believe are not thoroughly known in this country. What is known, however, is this. The yearly output of the chemical industry in Germany was £47,895,000 in 1897, and at present it may be estimated at £60,000,000, of which £20,000,000 worth is exported. At any rate, it is got out of the country and produced in the country, and "Protection" is not the secret of the production of this enormous amount of chemical material. It is due to an extraordinary state of things. I might mention what some of you possibly know. The entire manufacture of Alozacine, and about the whole of the adipaine indigo potassium cyanide and aniline dyes is in the hands of Germany. Further, whereas in 1840-50 about 9,000 tons of beet sugar (the yield of sugar from beet being 5·72 per cent.) was produced; in 1905-06, 2,400,771 tons of sugar were produced, and the processes for obtaining the sugar had raised the yield to 15·27 per cent.—purely a matter of the application of chemical industry to a particular kind of manufacture.

Now I am well aware that the figures are not easily assimilated by an audience, but I have mentioned them for the purpose of showing that the history of the entire chemical industry which I have just referred to dates entirely from the agitation of one man. A single man is responsible for this entire industry, and you know as well as I do that it was Liebig. For the first time in Germany there was a chemical laboratory in 1825. There was no chemical laboratory at that time except the one that Liebig, by his writings, and also popularizing to some extent his scientific work, founded at Geissen. Subsequently even places like Leipzig had no chemical laboratory at all. It was only in 1843 that Leipzig possessed a chemical laboratory. The German Governments of that day were won over to the cause of chemistry by Leibig's agitation for the creation of laboratories and by his numerous popular writings. Thenceforth assistance came readily from all quarters of Germany, laboratory followed laboratory, and the State provided money without stint for the advancement by it of chemical knowledge. And this is, to my mind, the important fact, which I would wish to urge you to remember: the State neither waited for individual enterprise, neither for private munificence, nor did it enquire whether any *immediate* result would be seen. They were simply convinced that the *study* of chemistry *might* be beneficial to the State and to the nation, and they considered that it was a duty to spend some of the money of the nation on chemical research, and did not refuse to listen to the legitimate demands of scientific men on the plea that it was not the business of the State to exercise foresight. I cannot help thinking that this is a sufficient piece of evidence to show that it does serve a State to foster its scientific industries. Chemistry, of course, may be a peculiar one; but I consider that a science like bacteriology stands in no whit of less importance to the community than that of ordinary laboratory chemistry. Further, one knows quite well that, without going into detail, in Germany nearly £60,000 is devoted to the purpose of veterinary education; in France it exceeds £40,000. In this country it is something, but it is a minimum amount. Not that we in any way are not willing and anxious to accept it, but

it is a small amount contrasted with the munificence of the States of Continental countries. That is so.

Now without the help of the State the growth of chemistry in Germany and its application to industry must have been crippled. Quite apart from other examples, it is sufficient to state here that the beneficial effect of chemical research is clearly evident in German agriculture, where the results are universally applied by peasants and proprietors. In this country the claims of science, and therefore of medicine and veterinary medicine, appeal to no political party; but feeling as I do that some of the State's money would not be thrown away by veterinary endowments and furnishing funds for researches which cannot be undertaken single-handed, but that require a trained army of workers, I trust I am in accord with the views of those to whom I am speaking when I say it is most desirable that such demands as these should be expressed.

Many of these reflections have from time to time come to me when, among other things, one realizes that the subject of veterinary physiology lags far behind that of veterinary pathology. Almost the only original work in purely veterinary physiology in this country has been done by one who is well known in this College. I refer to General Fred. Smith. On the innumerable points which arise in questions of histology and physiology of the domesticated animals, recourse has been had to Continental authorities, and I may say here that even these do not always help to solve a difficulty or to give you the accurate information which you require. In my opinion, a vast field lies open for research in veterinary physiology. I had thought that perhaps it might have been of interest briefly to describe some recent work which has a bearing on veterinary medicine, such as the extended researches of E. S. London, Abderhalsen, Oupler, and Sandberg, who during the past five or six years have specially studied the progress of digestion in animals by experimental methods which were originally perfected by Pawlow; but I do not think this would equal in interest the quite remarkable work of Payr, of Gratz, Stich and Makkas in Breslau, MacClure, Hœpfner, and Alexis Carrel, who, by their perfection of methods for suturing blood-vessels, have succeeded in the realization of what must doubtless have been a very old idea, namely, the replacement of a diseased organ in the body by a sound organ from another animal. I apologize if these results are very familiar; but, familiar or not, I am sure everyone could not possibly have heard of them. They are, to my mind, at any rate, of enormous interest, and quite unexpected. Now the success of such operations as the transplantation of a kidney from one animal into another, or of the spleen into another, both of which have been done with perfect success, depends entirely upon the success with which you can suture the blood-vessels together. We are aware that the ordinary teaching about the suturing of blood-vessels is that if you suture a vessel together—join it—you will undoubtedly get thrombosis; that you will, in fact, clot the vessel. The thrombus may even be carried as an embolus, and stick in some important part of the body. . . .

After stating that it was quite certain that they could transplant a segment of an artery into and make good a piece of artery taken out, and completely re-establish the conditions, the lecturer said that

this was remarkable. Not only could an artery of an animal be transplanted into another, but further, in the case of a limb they would find that these limbs had the same temperature; there was no difference whatever in nutrition between them after some days; but these were not temporary results at all. The animals lived to three and more years. It was certain, therefore, judging from observations, that the operations were successful.

Professor Buckmaster then continued: It was a dogma for years that thrombosis was the necessary consequence of interference with a vessel. This is certainly not true. Arteries can be joined either by invagination of one artery into another and by suture, or best of all by the apposition of the interior of the two arteries and using a circular suturing which goes outside the vessel. They are brought together in just the same way as in peritoneal wounds, where the two pieces of peritoneum are brought together. Other experiments have been made with magnesium tubes by Payr, but the best results are seen in joining the vessels so as to bring the interior of both arteries together and joining with a circular suture. The results of such experiments may be durable. A cross anastomosis of the carotid artery and jugular vein can be established and the animal remain alive for over three years, or the carotids can be cut and joined up transversely, so that the central end of one is sutured to the peripheral end of the other. On sacrificing the animals a year later, it was evident that neither was there thrombosis nor alteration in the calibre of the vessels; a ring-like scar devoid of elasticity was alone noticeable.

Transplantation of Vessels.

Carrel, among other cases, gives the transplantation of a segment of aorta into one dog from another, and of a segment of carotid into the carotid. In the histological appearances nine months later it is practically impossible to find any differences between the normal and transplanted parts, and even eight months after the operation of interpolating a segment of jugular vein into the carotid, the transplantation of veins into arteries must be admitted a possible, though difficult, experiment. Heteroplastic transplantations may also be successful, a fact one might at first hesitate to believe likely. Experiments of this sort show that circulation will be maintained for months, and the animal neither die nor get thrombosis. A further point which is equally remarkable. It has been taught that the tissues of one animal will not live in the organism of another, and, if the tissues are of a highly cellular nature, it is very likely the case. But Carrel has shown that a piece of human artery taken from the amputated thigh of a man can be transplanted into the aorta of a dog. What happens? What you find is this: the femoral pulse is perfect, the temperature of the limb is perfect, even after its remarkable implantation, the transplantation of a segment, or piece of human artery, which does not undergo cytolysis in the dog's body, into the aorta of a dog. You might say, "How long did the animal live?" As a matter of fact, the animal was killed for the purpose of seeing what was the condition thirteen months after the experiment; so I think the point may be considered to have been fairly established that this can be done, strange as it may appear. True enough the arterial muscle wasted, but the connection of the vessel was perfect, the tube being one really of

connective tissue, but at any rate a perfect tube. There are all kinds of other details which I do not want to weary you with; the carotid of a dog, for instance, into that of a cat, and also rabbits into cats and cats into rabbits. In other cases they transplanted the suprarenals; they also showed that the graft of these bodies by simple implantation was efficient.

In 1896 Knauer published the results of his ovarian transplantations. The ovaries were implanted in the peritoneal cavity, and three years later he found the grafted organs normal from the histologic standpoint. Moreover, some of the animals actually became pregnant. It is perfectly amazing. Dogs with grafted spleens can live for years, and animals have survived for over four months after extirpation of both kidneys and replantation of one kidney from another dog. Here you have clear evidence of a possibility, whatever be the future of this. I thought I would like to mention this, because it seems to me that even in introductory addresses, anything that is of great interest, and anything remarkable, is quite worth referring to. Although a great deal of scientific work is really very interesting, still there are some things which seem to have a wider interest than others. It seems to me that this is one; because, for my part, for a long time I was very sceptical indeed about the accuracy of this work, but I have changed my mind, because the evidence is too strong for me, and I have, like other men, altered my opinion; I accept, as I have described them, these experiments, and further, I am certain that you really have in them a very marvellous and unexpected set of phenomena. Whatever is destined to be the future of this work, it has, at any rate, demonstrated beyond any question that thrombosis does not necessarily follow the transplantation of vessels, and that the excision of arteries and transplantation is a possible operation. An organ which is so exquisitely sensitive to temporary interference as a kidney actually can be transplanted, and you can replace it from animal to animal.

The Ethical Standpoint.

Into the ethical side of the question, as to how far the experimental methods of physiology are justifiable, I do not propose to enter. I take it that each one of us individually either has already done so, or will at some future time, settle this question for himself with his own conscience. But here I may say that experimental methods lie at the basis of all real advance. And here again I would point out that there are no short cuts to knowledge. All knowledge has to be acquired with a great deal of labour, and though there be no short cut to knowledge, there may be short cuts to a superficial kind of learning, as everyone knows. The permanent additions to our knowledge made by all science have markedly influenced the progress of medicine. Incontestably is this the case; and properly directed experimental work, as I have pointed out, is to be looked upon as the basis of a real advance. Those who can really work and make experiments no longer listen with any toleration to those who simply guess at causes, or possess a whole lot of undigested ideas, especially if these are put forward in the place of knowledge derived from the logical sequence of evidence built up by experimental research. In all experiments, in fact in all fields of observation, what is called a "chance discovery," only favours the mind which is prepared. In that I am sure you will all agree.

To those students who come among us for the first time to-day, I believe I am expected to address a few words. In a sense we are all students, and many are, I suppose, likely to remain so. All men who work remain students. Of that there is no doubt. But I would hope that most, or indeed all of you who are proposing to enter the profession of veterinary medicine are under no delusion that your work will be light, or that it can be done in any careless or thoughtless way, and examinations passed with a minimum amount of work, for this is not so. Compared with all other professions, that of medicine, veterinary medicine included, is the most exacting one. But as a recompense it is probably most satisfying to the minds of those prompted to enter it of inclination rather than by accident. Unless you propose to earnestly pursue the work which lies before you with thoroughness, with a genuine love for knowledge, much of your time will be wasted, a part also of your life. Cultivate the habit not only of reading but of thinking for yourself, for this is the endeavour to develop a coherent set of ideas, in fact a system, even if it be not a complete one. There is an unfailing test of the man who not only reads but who thinks, for in the working of his mind he is distinguished in his character by decision, and his converse with his fellows is marked in consequence by lucidity and clearness. There is further an infallible sign of a man who thinks—I daresay all of you know it—and that is the directness of his judgment. Of that I am sure. The directness with which a man uses his judgment is in direct relation to his power of thought. Only with maturity of knowledge and experience will there be maturity of judgment, and therefore this is a question of time. It cannot be developed at the outset of anyone's work. I am not going to weary you with good advice, but I would urge perseverance and work, reliance on your teachers; and that you should preserve an honest love for your profession which you have adopted. Each one of us should remember that we are not an isolated unit, but we are members of a community, actual or prospective members of a profession, the influence of which in the country—the opinion in which it is held, and its status, as I have said—depends largely upon the loyalty of its members towards one another. May I add that nothing is more helpful towards the maintenance of a high level of conduct, and the avoidance of what is mean and contemptible, than to keep before one a high standard of attainment. The attempt to acquire this is within the reach of us all, and the striving for this will make for success, and thus redound to the welfare of this College.

DOURINE OR MALADIE DU COIT.

This abstract is taken from a special report on the subject by Dr. J. G. Rutherford, Veterinary Director General for Canada, and concerns the invasion of Canada with the disease. The following account of the pathological anatomy of the disease was written by Dr. Higgins.

Pathological Anatomy of Dourine.

All of the cases upon which it has been my privilege to hold autopsies have been destroyed on account of their presenting clinical evidence of the disease, and with one or two exceptions they were of

long standing. As a rule the general condition of an affected animal is much below normal, there is little evidence of fat, the ribs are prominent, and the hip bones are easily distinguished. Incision of the skin reveals the connective tissue to be of a yellowish tinge, with but very little fat. The muscles are somewhat pale, but otherwise appear to be normal. Where emaciation is marked the muscles present evidences of gelatinous degeneration with yellow serous infiltration. Removal of the hind legs at the coxofemoral joint reveals considerable œdema about the joint and the ligamentum teres. The ligamentum teres is not of its normal size in cases of long standing. The articulatory surfaces of this joint, particularly that of the acetabulum, in a majority of instances, present a distinct ulceration, usually somewhat triangular in shape and in one instance each side of this irregular triangle was 1 in. in length. The synovial fluid presents no alteration either in colour or consistency. The bones when split open were found to be very brittle, spongy, and infiltrated with gelatinous material. The articular cartilages may be eroded, and this erosion is particularly to be noted in those cases where the characteristic lameness has been a clinical symptom during the course of the affection.

On opening the abdominal cavity, fluid was invariably present, in which were seen numerous nematodes (*Filaria papillosa*). These, however, are usually met with in horses kept under range conditions, and therefore bear no special relationship to the disease under consideration. The connective tissue of the abdominal cavity was of the same yellowish tinge noticed in connection with the subcutaneous connective tissue. The mesentery also exhibits this peculiar colourathe spleen is soft and flabby, pitting on pressure, the pit not resuming tion. The intestines are pale, and on their serous surface evidence of previous inflammatory changes are usually present. The spleen is of a greyish colour, and the surface presents many petechial spots. In consistency its natural position on the removal of the finger. In size it is about normal or somewhat enlarged, and on its surface may be seen scars, which from a careful histological study, appear to be the result of hæmorrhage beneath the capsule. The liver appears to be much shrunken in size, in some cases appearing to be but half that of the normal organ, and it is of a much darker colour than is the case in horses not suffering from this disease. The organ is very firm, with no evidence of cirrhosis. The capsule of the liver usually presents evidence of an old inflammatory process.

Dr. Hadwen, while working with this disease at Lethbridge found that the maximum weight of the spleen in thirty-six cases was 2,976 grammes, while the minimum was 992 grammes, the average being 1,587·2 grammes. He also found that the liver presented a maximum weight of 9,672 grammes, a minimum weight of 6,944 grammes, while the average was 5,952 grammes. In the most advanced and emaciated cases he also found that there was no increase in the size of the liver, but that it was decreased in size, due to the fact that all available fat and nutriment had been absorbed in an endeavour to sustain life. The horses upon which these observations were made were condemned as soon as the symptoms warranted such action, and therefore were in different stages of the disease. The weight of the animals in question varied from 900 to 1,300 lb. A gelatinous deposit is usually found at

the hilum of the kidney, and this deposit responds to the tests for mucin. An enlargement of the kidney is also frequently noted, while histologically the cells are degenerated and largely replaced by strings of mucin.

Dr. Hadwen found ammonium urate in advanced cases, but was unable to demonstrate albumen or sugar. We have been unable to find evidence of sugar in urine taken from the affected mares with which we were experimenting here, nor in urine forwarded to this laboratory by Dr. Hargrave, of Medicine Hat, Alberta, taken from affected horses in various stages of the disease at the time of their slaughter. Calcium carbonate was found by Dr. Hadwen in the urine of two well-marked cases of dourine, in which there was paralysis of the hind limbs. In both instances, the hair of the tail and legs became matted with the urine, giving off a very offensive odour. In both of these animals the walls of the bladder were found at the autopsy to be 1 cm. in thickness. This increase of the calcium salts in the urine seems to be responsible for the great irritation following urination manifested by switching of the tail and eversion of the clitoris. In two of the cases which we have had here the urine has contained a great quantity of mucin.

In the seminal fluid of two diseased stallions collected after the covering of mares, Dr. Hawden found very few spermatozoa, and even these ceased their movements very quickly in coverslip preparations. The fluid ejected from these stallions was plentiful in supply, and from its general appearance was considered to be largely of prostatic origin.

The vaginal mucous membrane is pale and of a leaden hue with some scars. The mucous membrane is in folds, and there is an œdematous condition of the os, but otherwise nothing abnormal is noted. The mucous membrane of the uterus is usually of a leaden colour and œdematous. In some cases the œdematous folds were very pronounced, increasing the size of the organ considerably. The ovaries were invariably cystic, though I am not prepared to assert that this was due to the infectious process under discussion. None of the mares upon which I held autopsies had recently shown a profuse vaginal discharge, indicating that all were more or less chronic.

In addition to the general lesions described above, the testicles of two stallions were atrophied. In one instance the process had progressed to an almost complete absence of testicular tissue. In one of these stallions, Brucefield Prince, there was a diffuse œdematous swelling of the sheath. No marked changes were noted about the penis save a slight roughness of the mucous membrane of the urethra.

The following account of the diagnosis of dourine is from Dr. Watson's report.

The Symptomatology and Diagnosis of Dourine.

In previous reports on Canadian dourine, Dr. Rutherford has laid stress on the great difficulty of diagnosing this disease with any certainty during its earlier stages, and has drawn attention to the apparent mildness of the infection in many cases, especially in mares. In these respects, my own observations are in complete accordance with those of Dr. Rutherford.

A careful study of the cases detailed in this report will give much

more information than any attempt of mine at a general description of the symptoms and course of dourine (such may be found in the text-books and clinical literature upon the subject, but this literature I have found very misleading, it not stating with sufficient clearness the fugitive character, the frequency or otherwise, of the symptoms).

Many authors commence their discourses on the symptoms by saying that they may be divided into three stages. Baldrey (*Journal of Comparative Pathology*, March, 1905), states that these stages are distinct, and may, if the case is carefully watched, be recognized with comparative ease. This has been the exception rather than the rule in my experience with Canadian dourine. Lingard, in his "Report on Dourine," 1905, states that what really is observed in practice is an overlapping, or a partly concurrent exhibition of certain symptoms referable to the respective periods, and goes on to say that the arrangement is purely an arbitrary one, simply utilized for the sake of description. It is well, I think, to remember this reservation. The following notes may help to put the diagnostician on his guard:—

In the case of mare No. 36, a stabled animal, and, therefore, under daily observation, the first visible signs of disease were symptoms originating from the central nervous system, which belong, according to the arbitrary division, to the "third" stage. These indications were followed by the "first" stage, namely, tumefaction of the genitalia, sexual excitement, &c. The first appearance of symptoms belonging to the "second" stage, namely, patchy infiltrations of the skin, the so-called plaques, were concurrent with the nervous manifestations, and have later appeared when only a trace of the "first" and "third" stages remains.

In the case of experimental animal No. 39, the disease ran an acute course, terminating fatally one hundred and thirty-nine days after infection. Nervous symptoms predominated throughout the infection.

In the case of experimental animal No. 29, dourine parasites were present in the vaginal mucus at irregular intervals from the eighty-fifth to two hundred and twenty-ninth day after infection, and yet only at the end of this period have there appeared any visible signs of disease, these being more or less indefinite and limited to a slight tumefaction of the vulva, and a somewhat swollen, anæmic, vaginal mucous membrane.

These may be extreme cases, but others can be cited, both in naturally and experimentally infected equines. It is only necessary, I think, to emphasize the fact that symptoms may appear shortly after, or not for a very long period following infection, or that they may abate or disappear for equally long periods at any stage of the disease, and lastly, that loss of co-ordinate locomotion or other signs of nervous derangement may be the first and only signs of the disease visible to the naked eye.

Œdema.—Most authors argue that the only truly pathognomonic sign of disease is the eruption of the cutaneous plaques. These patchy infiltrations of the skin, however, have been found so rarely, in cases that have come under my observation, that some other sign has had to be searched for. It is well established that in the various trypanosomiases of animals, including dourine, œdema in some form is the most constant feature. In dourined mares I have found that the most

frequent and constant sign of infection is the tumefied or infiltrated mucous membrane of the vagina. This condition has been observed in 70 per cent. of my cases. In the absence of plaques, it is only in blood or mucus from this lesion that I have succeeded in finding the dourine parasites. In stallions, the œdema usually commences in the mucous membrane of the urethra and meatus urinarius. This condition, however, is sometimes difficult to ascertain or may escape notice, the first sign of disease being noted in a tumefied penile sheath, intermittent in character.

Vesicles and Ulcers. — As far as I am aware, trypanosomata have never been proven to be the actual cause of vesicles and ulcers. These lesions do occur in a small percentage of dourined mares, and in a large percentage of dourined stallions (see Table of Symptoms), but they are not, in my opinion, caused by the trypanosomata. In the case of mare 36, I have recorded the finding of trypanosomata in fluid from a vaginal vesicle. This was not a typical vesicle, and it would have been more correct, I think, to describe the lesion as small, patchy or nodular infiltration of the mucous membrane. From typical vesicles and ulcers I have never succeeded in isolating a trypanosome, and I am not aware that other investigators have succeeded in doing so. I may state, however, the frequent occurrence of spirochætæ in these lesions, in some micro-preparations these organisms appearing as in a pure culture, in nests and colonies. This is of interest in view of the discovery of spirochætæ (now called the *Treponema pallidum*) in lesions of human syphilis. Jowett, in his publication, "Notes on Blood—serum Therapy," describes spirochætæ in cases of canker and grease in equines. The appearance of the genitals in dourine when ulceration and vesication are extensive, is not unlike the condition occurring in "grease." Professor Schaudin's interesting hypothesis on the transition of trypanosomata into spirochætæ has provoked severe criticism, and is not generally accepted.

Depigmentation.— In several cases of dourine I have observed depigmentation independently of pre-existing vesicles on ulcers, and, further, that certain tissues, especially the muco-cutaneous margins of the vulva, which had become depigmented during a genital tumefaction, regained their colouring matter when these swellings subsided. This phenomenon is unusual, I think, depigmentation generally persisting for a lengthy period, if not permanently, and often associated with vesicles and ulcers.

Conception and Abortion.—"Infected mares do not, as a rule, conceive, but if they do, almost invariably abort at about six months" (Pease). "It has been noticed in India that from this time (the primary symptoms) although the stallion is capable of efficiently covering the mare, he is entirely sterile" (Baldrey).

Three mares in the "third" stage of dourine have given birth to apparently healthy offspring at this station. Three other mares, found to be affected with chronic dourine, and in each of which the diagnosis has been confirmed by the finding of the trypanosomata, had young foals at foot. At autopsies on slaughtered mares I have several times found them to be pregnant. This is probably the exception. Nevertheless, abortion in my experience is a rare event, occurring only in those advanced cases where there is emaciation and loss of co-ordination. In examining the semen of dourined stallions I have found numbers of dead spermatozoa and rarely a motile form.

Methods of Diagnosis.—It was hoped that in the absence of trypanosomata in the blood and vaginal mucus, puncture of the enlarged lymphatics would yield good results, similar to the success of that method in the diagnosis of sleeping sickness. I have punctured the

TABLE OF SYMPTOMS—SHOWING THE FREQUENCY (PERCENTAGES) OF SYMPTOMS IN STALLIONS AND MARES, RESPECTIVELY.

Signs, Symptoms, Lesions	Percentage in Stallions	Percentage in Mares
Genitalia:—		
Tumefaction of vulva	—	34
,, ,, penile sheath	75	—
Genital discharge	—	20
Abnormal sexual excitement. Nymphomania	—	15
Distinctly hæmorrhagic mucous membrane	12	5
Swollen œdematous ,, ,,	—	70
Protrusion of mucous membrane of vulva	—	5
Eversion ,, ,, ,, Meatus urinarius	65	—
Phymosis, paraphymosis	37	—
Depigmented spots or leucodermic patches (vulva, perinæum, penis and sheath)	62	34
Vesication	25	10
Ulceration	37	6
Cicatrization	12	9
Distortion, atrophy	—	15
Nervous System:—		
Muscular and nervous inco-ordination—		
(a) Front limbs and quarters	—	10
(b) Hind ,, ,,	25	30
Facial paralysis and distortion	—	5
Cutaneous Lesions:—		
Patchy infiltrations or plaques	—	6
Localized œdema	75	10
Ocular Phenomena:—		
Conjunctivitis	25	5
Keratitis, corneal opacity	25	4
Suppurative Processes:—		
(*a*) Limbs and joints	12	6
(*b*) Genitalia	12	—
Enlarged lymphatics	25	43
Nasal discharge	—	4

glands in a number of cases and in various stages of the disease, but without ever finding a trypanosoma. Neither have I ever been able to find the parasite in the cerebro-spinal fluid. Blood-letting has proved an important aid in some cases. Serum-tests, after further

elaboration, will, I trust, yield better results. In the meantime, owing to the absence of parasites, the diagnostician must depend on clinical symptoms and consider the history of the suspected animal.

With the assistance of Dr. Gallivan, I have prepared a table of symptoms. The percentages are based on an analysis of sixty-four cases of dourine (fifty-six mares and eight stallions), that have come under our observation within the past twelve months. This may be of some value to those called upon to diagnose the disease, who have not had the opportunity of familiarizing themselves with the frequency of certain conditions.

REPORT ON A CASE OF DOURINE (NATURALLY ACQUIRED).

No. 36. Mare "Tiffin," 9 to 10 years of age. Clydesdale Stock (Ontario).

Date and Source of Infection.—Not definitely determined. The mare was covered several times by different stallions in the summers of 1904, 1905 and 1906. Fertilization did not occur. A Clydesdale stallion, a few weeks after the covering of this mare in August last, exhibited a slight swelling of the sheath and scrotum. This swelling was somewhat increased in November, and assumed an intermittent type. In February, 1907, the swelling had not reappeared. A grey stallion that covered the mare in September has remained apparently healthy up to the end of the year 1906.

The Earliest Sign of Disease.—First noted by the owner of the animal in the latter part of November, 1906, as a tenderness over the loins followed by a peculiar stumbling and erratic gait, these symptoms rapidly becoming so severe that the mare could only be taken out of her stable to water with great difficulty. The mare had been steadily worked during the previous summer and fall, and up to the time that the disease was manifested by the above symptoms. It is of interest to note that this is not a range mare, but one that has been more or less continuously under the immediate observation of the owner, who states that he never observed any abnormal conditions of the genital organs, save that the mare will not breed.

On December 19, the animal came under my personal observation, and her general appearance and condition was good, with the exception of the loss of control described later under "Nervous Symptoms." Further investigation has left little doubt that this mare (36) was infected by the Clydesdale stallion No. 35. Other mares covered by the same stallion previous to the covering of mare 36 have been found to be diseased. Furthermore, the stallion, after a period of nearly one year subsequent to the covering, a period in which only slight and occasional manifestations of the disease were noted, has completely broken down, presenting characteristic and intensely severe symptoms of dourine.

The Genital Organs.—On December 19, 1906, a slight orange tinge to the mucous membrane of the vulva, less so of the vagina, was observed; secretion very scanty, clitoris very pale. Microscopical examinations of the scrapings of the genital mucous membranes were made upon the following dates: December 19, 23, January 1, 4, 15 and 29, at intervals of four, nine, three, eleven and fourteen days respectively. Bacteria were usually very plentiful and in great variety. Spirochætæ were numerous, and rarely a few cell-like irregular forms

without flagella, which were suggestive of immature or amœboid forms of trypanosomata.

The first demonstration of the *Trypanosoma equiperdum* was on February 11. On this date the mucous membrane of the vulva, extending to the vagina, was distinctly orange tinged, slightly corrugated and œdematous. A well-defined vesicle was visible on the inner border of the right labium, and the base of the vesicle was a little more than 2 cm. in diameter, being raised, much firmer and more œdematous than the surrounding tissues. This small œdematous area, including the vesicle, was slightly scarified. Three smear preparations were made of the sero-sanguineous fluid, in two of which the trypanosomata were found. The organisms were very rare, sixteen only being counted after searching the whole of the smears occupying many hours. Trypanosomata have since been demonstrated in the vaginal mucus or in traces of blood from scarified œdematous points of the mucous membrane, more or less constantly up to this date, March 16.

The contour and general appearance of the vulva are slowly changing. (March 31, 1907.) A few small depigmented spots recently appeared at the edges of the labia, gradually increasing in size until there is now a distinctly leucodermic area on either side of the vulva. The mucous membrane is slightly everted, the clitoris totally depigmented, and the vulva tumefied.

The mucus is very scanty, the inner borders of the labia and the clitoris being pale and dry. The œdematous "pinheads" of the mucous membrane have disappeared, but on the floor of the vagina are two well-marked œdematous areas, about 2½ cm. in diameter, straw coloured, and semi-transparent. The temperature has assumed a more normal and regular curve. The appetite has never failed, and the general condition has improved slightly, though inco-ordination of the limbs is still apparent and the hind quarters sway from side to side.

Trypanosomata have been demonstrated in the sero-sanguineous fluid of the vaginal mucous membrane, upon the following additional dates: March 20, 21, 23, 24 and 25. A few of the organisms appear to be assuming an amœboid form, the body of the parasite being much less elongated than usual, the nucleus large, and the flagellum absent or unstained.

Sexual excitement was manifested for a period of five to six months, commencing four months after infection, and was accompanied by pruritis. From March to June, 1907, the condition was that of nymphomania save during this latter period; the mucous secretion has at all times been scanty. The external genitals under suface of tail and inner sides of thighs have never shown evidence of a vaginal discharge. In June and July, 1907, the depigmented spots and patches spreading from the muco-cutaneous margins of the vulva had partially and at this date (November 15), totally regained their colouring matter and a normal appearance. Neither an ulcer nor a cicatrix has ever been observed. Tumefaction of the labia has disappeared. The vaginal mucous membrane remains swollen, tough and elastic. In small areas or patches there are clusters of lymph follicles giving the membrane a finely nodular or puckered appearance.

Cutaneous Manifestations (the so called Dourine "Plaques").—No. 1,

appeared December 22, 1906. A small swelling about 1 cm. in diameter, oval surface, hardened skin, not pitting on pressure. Situation, posterior left ribs. The swelling persisted for two days. Trypanosomata not found in smear preparations from small incision.

No. 2, appeared December 31. A small swelling similar to No. 1. Situated on the lower portion of the right breast. Trypanosomata were not found in a blood smear from this swelling. Disappearance slow and gradual, the skin remaining hard for several weeks.

No. 3, appeared February 11, 1907. Size about 4 cm. in diameter. The outer border was harder than the centre. February 13, swelling decreased; February 14, the fourth day, the swelling was harder and flatter; on the 16th, the sixth day, only a circular area of hardened skin remained. The swelling was punctured on February 11 and 14; there was no exudation of sanguineous fluid, but just sufficient blood for three small smears on each date, all of which were negative.

No. 4 appeared on the same date as No. 3, and was slightly larger circular-shaped, not œdematous, situated just below point of left hip, very much diminished on February 16. Skin remained hard for three weeks. Blood smears taken February 11 and 19, negative.

Nos. 5 and 6, appeared August 25, 1907, in the form of a double plaque over the middle of the right ribs. The swellings adjoined one another, each being 5 to 6 cm. in diameter and raised ½ to 1 cm. above the surface of the surrounding skin. The swellings were quite firm, flat, and not more raised at the centre than at their circumference. Six microscopic preparations of the sero-sanguineous contents were obtained from a puncture. Trypanosomata were found in two of these six specimens, the parasites being very few, vacuolated, swollen, degenerated, or involution forms. The plaques had entirely disappeared on the third day after eruption.

No. 7 appeared September 2, over the middle left ribs, and was about the size of a silver dollar. Parasites could not be found in the fluid from puncture.

September 4, only a trace of plaque No. 7 remained.

September 7, re-appearance of the plaque in the same position and of four smear preparations made trypanosomata were found in one. The parasites were very rare.

November 15, no further cutaneous lesions have appeared to date.

None of these swellings could by any means be called a typical plaque, being neither the distinctly œdematous nor the disc-shaped tumour as described by Lingard and others. It is possible, however, that they appeared before the dates given above, and were not observed until in the disappearing stage, which would account for the absence of the trypanosomata from the blood smears. One peculiar characteristic of the swellings is in the persistence of a hardened area of skin for a very considerable time after the swelling has been absorbed.

Nervous Symptoms.—On December 19, 1906, there was a great tenderness and weakness of the loins. The animal could be forced to the ground by slight pressure on the lumbo-sacral nerves, on either side.

Paraplegic symptoms of the hind limbs were pronounced. The hind quarters appeared "dropped," and the loss of control was most

evident. Both fore and hind limbs were placed in most erratic and singular positions. The attitude was crouching. The hind quarters swung to the left, often remaining in that position when the animal was at rest. Knuckling of the hind fetlocks was extreme, the pasterns being at times in contact with the ground. On being turned loose in the corral, locomotion seemed almost entirely mechanical, the animal appearing to wish to travel in a different direction to that in which her limbs were taking her.

On December 29, 1906, the animal was profusely bled from the jugular vein until there were evinced signs of distress and weakness. During the next week locomotion and the condition of the loins and limbs steadily improved. The knuckling was greatly reduced, nervous and muscular control was resumed, and the tenderness over the loins finally disappeared. During this time (the month of January) the animal was kept under severe conditions in a pasture where the grass was scanty, the snow deep, and the cold intense. Since February 11, when trypanosomata were demonstrated in the vaginal mucus, the nervous symptoms have reappeared, slowly and gradually increasing in intensity, but have not yet reached the same degree as before the blood-letting. On June 1 there was great improvement in her condition. The knuckling and nervous inability can scarcely be observed. Trypanosomata at this time were occasionally in vaginal blood.

Throughout June, July and August, 1907, a great moderation was noticed in the symptoms of neuro-muscular inco-ordination. The gait had become much steadier, and the knuckling of the fetlock joints was scarcely perceptible. Occasionally, for brief periods, there has been seen an intermittent "tripping" gait, with swaying of the hind quarters from side to side, but on the whole a steady, slow improvement has been maintained up to the present date, November 15, 1907.

The Body Temperature.—Previous to February 15 the temperature was only occasionally recorded, and was found to be between 100° and 101° F. Morning and evening temperatures have been taken daily since February 16. From the fifth day after demonstration of trypanosomata in vaginal mucus the temperature remained constantly between 101° and 101·4° F., a variation of but half a degree, with almost an entire absence of a normal regular daily rise and fall. On the fourteenth day there was a sudden elevation to 103·6° F., the respirations being shortened and pulsations increased to 60 to 65 per minute. The nervous symptoms of the hind quarters and loins became more apparent. The temperature gradually fell again to the neighbourhood of 101° F., the lowest being 98° F., and the highest 102° F.

The Leucocyte Count.—Seven differential counts of the leucocytes of the blood of this animal have been made during the three months of observation at intervals of four, eight, two, forty, six, and seven days. Upon every occasion the relative percentages were found to be about normal, but at the same time there was a decided absolute leucocytosis, all classes of cells being increased. This could easily be determined by a short examination of the stained smear, and by the ratio of the red to the white cells, without actually making a quantitative count. The bone-marrow type of cell, the polymorphonuclear neutrophile, always predominated over the lymphoid cell, and this blood-picture has been found in the other cases of dourine at this

station, in which the blood has been studied, as evinced by nervous symptoms or intermittent œdematous swellings. An opposite condition, namely, an absolute leucocytosis with a predomination of the lymphocyte type of cell, has been observed in those cases of dourine in which the disease is in a latent stage, where the *materies morbi* is lying dormant, or where the animal is making a recovery, apparent or real. The hæmoglobin scale (Talqvist) registered 80 to 85 normal.

The Demonstrations of the T. Equiperdum.—In vaginal mucus, trypanosomata were present in fourteen preparations; thirty-five examined. In vaginal blood, trypanosomata were present in twenty-seven preparations; seventy-two examined. In blood from the plaques, trypanosomata were *not* present in nineteen examined. In blood from the tail, trypanosomata were *not* present in ten examined. In blood from the jugular vein, trypanosomata were *not* present in nine examined. Thus the organisms were never found in blood drawn from the general circulation or cutaneous swellings, but it is probable only in the early eruptive stage of the latter that the organisms are ever observed.

In the vaginal mucus and vaginal blood the organisms were found in nearly the same proportion of preparations, namely, 40 and 38·8 per cent. respectively. In the mucus they usually appear small, contracted, and often vacuoled, or very thin and elongated, are stained with difficulty, and not always easy to differentiate from the cellular *débris*, &c. To secure a good preparation, the mucus must be very thinly spread and without pressure free from dirt, and dried instantly. On several occasions preparations from the blood and mucus were made before and after a thorough irrigation of the vagina with a solution of sodium chloride and sodium citrate (sodium chloride, 5 grammes, sodium citrate 5 grammes, boiled water 1,000 c.cm.), and where but one or two trypanosomata were found in several smears before irrigation they were more numerous in those taken immediately after. The preparations of February 20, in which the organisms were the most numerous during the whole of this series of examinations, were taken immediately after an irrigation.

Trypanosomata were found in the mucus only in the absence of bacteria, or when the latter were very scanty. The irrigation of the vaginal canal with a citrate solution is favourable to the detection of trypanosomata, not only removing the bacteria and toxic mucus, but causing a fresh and increased secretion from the vaginal membranes, in which, especially after a slight scarification, the trypanosomata are more likely to be found. It is important to scarify the membrane very lightly, so that only a small trace of blood exudes, and at those minute points that present an œdematous or vesicular appearance. In preparations made from drops of blood flowing from a deep puncture through the mucous membrane and into the underlying tissues I have not been able to find a single trypanosoma.

Several conjugating parasites were observed in the vaginal blood, and multiplication forms were not uncommon. The trypanosomata were extremely rare in a great majority of the preparations, two to three organisms only being observed in each, and it has frequently been necessary to search a slide for one to two hours before finding a single parasite.

As already detailed, trypanosomata could be found more or less

constantly in the vaginal blood and mucus between February 11 and the end of March, provided a sufficient number of preparations were carefully searched on each day of examination. In April the parasites had almost wholly disappeared, and were found on only one occasion, April 9. The last observation of trypanosomata in the vaginal blood was made on June 29, but on August 25 and September 7 the organisms were found in the contents of the cutaneous plaques.

NOTE.—I would again call attention to the value of irrigating the vaginal mucous membrane with a warm solution of sodium citrate and chloride previous to the preparation of blood smears or the collection of blood for examination. This procedure has in my hands greatly facilitated the search for the parasites, and has now become habitual with me. I have repeatedly secured preparations before and after irrigation, finding the parasites only in those taken after.

Some Points of Interest.—Three months elapsed after the covering by the Clydesdale stallion (No. 35) and the first manifestation of the disease. Notable features of the case are—the absence during these three months, according to the animal's owner, of any lesions of the genital organs and the fact that the disease, instead of being primarily localized to these organs, as is usual, became rapidly generalized.

The nervous phenomena were the first noticeable manifestations of the disease, by which the diagnosis was made, being confirmed seventy-eight days later by the finding of the trypanosomata. A marked sexual excitement has at all times been evident on bringing the mare in proximity to a stallion.

To the profuse blood-letting, which was pushed to the physiological limit, I attribute the disappearance of the nervous symptoms by the removal with the blood of a great amount of toxine of the disease.

OBITUARY.

JAMES GRANT, 29, Upper Warwick Street, Liverpool, died on September 27, 1909, at 104, Errol Street, Liverpool, from pulmonary tuberculosis. Aged 40. Graduated December 19, 1893, at Edinburgh.

THOMAS AITKEN DOLLAR, 56, New Bond Street, London, W., died on September 26, at the above address, the cause of death being chronic glycosuria of some years' duration, cerebral thrombosis seventeen days, pulmonary œdema twenty-four hours. Aged 75. Graduated January 15, 1851—1880, at Edinburgh.

THE SERVICES.

(From the *London Gazette*, September 10 and October 1).

Indian Civil Veterinary Department.—Captain George K. Walker, M.R.C.V.S., to be Major.

Territorial Force (*Unattached List*).—Sydney Smith to be Veterinary Lieutenant; Denham R. Chatterly to be Veterinary Lieutenant.

Translations.

A FORM OF PNEUMONIA DUE TO FOREIGN BODIES.

BY PROFESSOR STAZZI, MILAN.

FOLLOWING the administration of castor oil mixed with decoction of gentian, a score of cows out of fifty-seven showed respiratory troubles, cough and dyspnœa. Twelve other cows having received castor oil without the addition of gentian, remained healthy. One of the sick animals died on the thirteenth day; another was killed as a matter of urgency on the fifteenth day.

The lungs were voluminous, hepatized in the middle lobe, and at the infero-anterior region of the left posterior lobe; colour violet and the large bronchi filled with greyish mucus; the small bronchi obstructed with muco-pus. Reddish grey and dark red lobules were to be seen giving a varied aspect on section; bronchial mucous membrane was red and tumefied.

Inoculation of a guinea-pig with the pulmonary exudate gave no effect. On microscopic examination the intra-lobular bronchi were filled with pus, and their walls infiltrated with round cells; the capillaries were engorged with blood, the alveoli were packed with granulous exudate, mixed with desquamated epithelial cells. Around the bronchi the alveoli contained fatty drops. In the cows still ill, cough, quickened respiration and great diminution of milk supply was noticed. On auscultation, great moist râles were heard in the chest. Stazzi advised stimulating the chest-walls and administration of alcohol. All the symptoms disappeared, and the milk supply returned as before the accident,

(*Clinica Veterinaria.*)

ATTITUDE ASSUMED BY HORSES WHEN THEY ARE STRUCK BY A BULLET.

BY ARMY VETERINARY SURGEON MALEVAL, OF THE EXPEDITIONARY CORPS AT CASABLANCA.

WHEN horses are at the trot or gallop, and bullets whistle around them, they do not appear to notice them. When they are at the walk or standing still, many do not move. A few, however, are restless, turn their ears about; others are disturbed and paw the ground.

When a bullet strikes some metres in front of them some horses throw their heads back quickly. If the missile falls near them its whistling and the light cloud of dust which it raises causes a quick bound to one side, with a tendency to make a half turn. The writer noticed one day four cavaliers some metres behind going at a walk, with slack reins and nearly abreast. Suddenly a bullet fell near them; the four horses quickly threw themselves to the right and left, making a half turn, and the horsemen tried to bring them back again as energetically.

When a bullet falls behind certain horses one sees them press their tail between their buttocks, bend their hocks, and seek to fly forward. One evening, about 8 o'clock, we were employed, some metres outside

the camp trenches, in attending to General D.'s horse affected with slight colic. At the moment when a farrier was going to give an injection a bullet fired from a neighbouring garden fell between the horse and him. The horse gave an enormous jump, putting his tail between his buttocks, whilst the farrier made another bound in the inverse direction. Nobody was hit.

When horses are going at the quick paces and they receive a bullet, they hardly move. Certain riders do not notice at the moment that their horses have been hit. On the other hand, when at the walk or at a standstill, they generally acknowledge the ball that strikes them by a huge jump to the side or forward. They give one the impression of receiving a violent blow with a horse-whip. We have, however, seen a horse at rest receive a bullet of small calibre without flinching. Those horses that fall in a heap are rare (wounds of the brain and heart). Some do not move at the moment, but after some minutes of the anguish, during which they have fixed eyes and trembling limbs, make a few tottering steps and fall (wounds of the great vessels and internal hæmorrhage).

Other horses have different attitudes. Thus an Algerian cavalry mare, receiving a ball in the cheek, fell on her knees, got up immediately, and made three bounds forward. A horse attached to a picket in the camp received a ball in the neck; he was literally mowed down, as if the earth had suddenly disappeared under him, fell an inert heap on his side, and did not rise when approached.

At the walk, an Algerian mare had a posterior pastern shattered by a ball; she sank down quickly on her hind parts and fell, causing the fall of her rider.

VULNERANT ACTION OF BULLETS.

BY ARMY VETERINARY SURGEON MALEVAL, OF THE EXPEDITIONARY CORPS AT CASABLANCA.

Influence of the Shape of the Bullet.—The bullet acts by perforation with or without dilaceration. If we set aside the force behind the bullet and only take account of its shape, we can say that the perforation is so much the more simple according as the calibre of the projectile is small and least deformed. One notices this between wounds produced by the bullets of a gun of small calibre and one of large bore, those due to a ball of regular shape and that deformed by an anterior shock; still one finds all intermediates, from a punctiform perforation to great shattering. Nevertheless, all these wounds possess the common character of being *contused wounds*.

Influence of the Active Force.—Let us recall from the surgical point of view that the *power of penetration* of a bullet is represented by the formula $\frac{1}{2}$ M.V^2, *M* representing the bulk—the weight of the projectile—and *V* its force, which goes on decreasing on leaving the firearm. The line of a ball may be divided into three zones according to the havoc committed: zone of *explosion*, zone of *perforation* and zone of *contusion* (spent bullets). The average figures accepted at present are: for the first zone, from 0 to 500 metres; for the second, up to 1,500 metres and more, with a descending scale in the gravity of the

lesions; finally, for the third, from 1,500 metres to the point where the bullet drops.

Influence of the Resistance at the Point Struck.—The *rôle* played by a bullet depends on its calibre and the active force animating it.; a third factor—the resistance opposed to the penetration of the ball—must also be kept in view. The harness of a horse can oppose, in certain parts, such a resistance as to arrest the missile (pannels, buckles, straps). The ball may deviate in passing through these. It then arrives on the body with a diminished force, with a shape often modified and a surface generally enlarged.

Whilst the small and not misshaped projectile has chiefly a penetrating action, the large one by itself, or by becoming deformed acts by rebound and dilaceration; it produces on soft parts large irregular wounds sometimes filled with harness *débris*, and on the bones lesions where dilaceration is more pronounced than perforation.

Mode of Action of Bullets.—The theories of poisoning, burning (Socin), of projectile air (Melseus), of hydraulic action (Hugnier, Rocher) have been abandoned for a long time. The majority of authors to-day rally round the *theory of contusion*, which may be shortly stated thus (Delorme).

(*a*) Bullets act in two ways, producing a *direct attrition* of tissues and an *indirect attrition*. The first is the effect of the ball itself; the second is the effect of the rapid communication of the active force by which it is animated to the solid and liquid molecules it displaces.

(*b*) When the ball is animated by a feeble driving force the phenomena of direct prevails over that of indirect attrition. When the missile possesses a great force the inverse is produced.

(*Revue Générale de Médécine Vétérinaire*).

TRANSPORTABLE APPARATUS FOR THE CREMATION OF THE WHOLE OR DIVIDED CARCASE OF ANIMALS.

BY DR. WILLIAM STÖDTER.

THE destruction of dead animals is interesting from the point of view of sanitary police, and particularly so in the case of anthrax. A new movable apparatus orginated by Director Maendel, and manufactured at Vyrrbator (Hungary), seems to fulfil all requirements. It has been tried at Hamburg in the presence of numerous official personages. The body of the destructor is mounted on four wheels and the putting of carcases into it is facilitated by a very ingenious mechanism, which permits one man to manipulate an entire large animal. Incineration is complete in four or five hours with 150 to 200 kilogrammes of wood. The body is composed of a cylinder of beaten iron, having a door closing hermetically, and leading to a grating and hearth. A car attached to a cable and winding wheel serves to draw in the carcase. An interior rail serves to sustain the car supporting the cadaver. The chimney can be lowered during transport. A trial was undertaken at Hamburg on the carcase of a horse weighing 500 kilogrammes, which was consumed in five and a half hours by using

210 kilogrammes of pine wood. Little ash remained, and smoke was sparse and without bad odour.

Maendel's apparatus, patronized by the Hungarian Veterinary Surgeon, Leopold Bard, deserves to be recommended for country use.

(*Revue Générale de Médecine Vétérinaire.*)

CYSTOSCOPY AND CATHETERISM OF THE URETERS IN THE DOMESTICATED ANIMALS.

BY REDECHA AND KASZAS.

In human medicine cystoscopy and catheterism of the ureters have been used for a long time as diagnostic means. These preliminary researches had for their object the determining as to how far these procedures were applicable to the mare and the bitch. Nitze's utero-cystoscope was used, which permits cystoscopy and catheterism of the ureters at one time. It was found that cystoscopy was practicable without difficulty, both in mares and bitches, but that catheterism on the contrary was possible in mares only. In bitches, however, catheterization seems facilitated, by the anatomical conditions of the ureters. The orifices are indicated by a deep red spot of the diameter of a lentil, surrounded by a clear aureole, and the urine escaped in drops.

(*Revue Générale de Médecine Vétérinaire.*)

Books and Periodicals, &c., Received.

Journal of the Royal Army Medical Corps; Agricultural Journal of the Cape of Good Hope; Agricultural Journal of the Transvaal; London University Gazette; Report of the Director-General of the Army Veterinary Service.

Letters and Communications, &c.

Professor Craig; T. F. Prime; G. Mayall; Professor W. L. Williams; Board of Agriculture and Fisheries; Department for Agriculture and Technical Instruction for Ireland; S. J. Motton; Professor O'Connor.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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